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FRACTURES OF THE LOWER PART OF THE LEG.¹

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THE reason for introducing this subject for discussion is not that there is anything radically new in the principles of treatment of fractures, but for two reasons:

In the first place, in this branch of surgery, so important in the economic life of the community, it is necessary to review these principles from time to time and to see that the detailed method we use

to attain them is the best possible and is being applied as efficiently as possible.

Secondly, we wish to demonstrate to the general practitioner on what lines we at the Adelaide Hospital have during recent years developed the details of application of the principles of treatment to fractures of the leg, with considerable improvement in our functional results and comparative elimination of delayed or non-union.

Results of treatment of fractures by any method vary with the amount of individual attention together with correct application of the principles of treatment of fractures, which are: (i) Reduction of deformity to a true alignment. (ii) Fixation of the limb to retain the reduction uninterruptedly and until the fracture is consolidated. The more perfect this fixation, the less pain there is in early stages and quicker union, and the fewer the cases of delayed or non-union. (Efficient fixation usually needs fixation of the joint above and below the

¹Read at a meeting of the South Australian Branch of the British Medical Association on July 30, 1936.

fractured bones.) (iii) Maintenance and restoration of function of the limb.

The British Medical Association Fracture Committee, 1912,⁽¹⁾ definitely demonstrated the interdependence of anatomical and functional results. No method which does not promise a good anatomical result should be accepted as a matter of choice.

With regard to uninterrupted fixation, the conclusions of Watson Jones and Roberts⁽²⁾ on calcification and decalcification in bone may be summarized as follows: Decalcification of bone in fractures is the result of hyperæmia in the bone ends. Increased calcification is the result of impaired local blood supply. The initial traumatic hyperæmia causes decalcification which continues as long as hyperæmia in the bone persists. When it has subsided, calcium is deposited in the connective tissue which has formed between the bone ends. In the later stages of repair and fibrosis the blood supply in the callus is impaired and dense calcification of callus occurs. Repeated slight movement of the fracture site or its repeated strain before dense consolidation gives recurring hyperæmia and consequent decalcification and delayed or non-union. To prevent this possibility perfect uninterrupted fixation is required.

It may be said that ribs join in spite of constant movement, animals' bones unite *et cetera*; but the above dictum is particularly true of the tibia, where the lower part is notorious for a proportion of delayed union or non-union, as also is the neck of the femur, the lower end of the radius and the shaft of the humerus—all sites where complete fixation of fragments is comparatively difficult.

In this series of cases, in which we have regarded continuous fixation as essential, we have had no cases of non-union and only one case of delayed union in which gross infection of the bone ends had occurred.

At various periods individual methods have been put forward emphasizing the relative importance of one or other of these three principles. Realization of the advantage of fixation dates from the early ages. Egyptian mummies of 5,000 years ago show this use of fixation. Until quite recent times fixation was the main object of treatment by the use of padded splints and closed plaster and other forms of casts. Prolonged splint fixation, excessive immobilization of joints with, incidentally, frequent imperfect immobilization and of the fracture, often resulted in delayed restoration of function.

Then came a period when early movement and massage were advocated by Lucas-Championnière to preserve function, which he placed before exact reduction or complete fixation. This often entailed too much movement at the fracture in splint adjustments, which occasionally induced non-union or malunion.

Böhler's methods,⁽³⁾ the success of which has attracted so much attention, are the basis of the methods we have used; they aim at: (i) complete

anatomical reduction of the fragments; (ii) efficient fixation applied without interruption until the fracture is firmly consolidated by bone; (iii) during the necessary fixation of the well-set fracture as many as possible of the joints of the limb and of the whole body should be actively moved through the full range that can be borne without pain, so as to prevent damage to the circulation, wasting of muscles and bones, or stiffness of joints.

Massage and passive movement before union occurs are not only inferior for production of good function in the soft parts, but harmful in that their performance interferes with the uninterrupted fixation essential to quick and certain union.

In application of these principles to fractures of the lower part of the leg two points are important: (a) The greatest obstacle to reduction is the longitudinal muscle action. (b) The majority of fractures of the tibia are oblique. Thus correction requires extension.

To retain this correction, not only is splinting required to prevent lateral and angular deformity, but to prevent overlap until consolidation has occurred continued extension is necessary in all except completely reduced transverse fractures or reduced fractures in one bone only, and those, for example, Pott's or malleolar fractures, in which the length of the limb has not been interfered with.

The lower fragment of the leg is small, and it is difficult to maintain sufficient extension by external means except by such an appliance as a Sinclair's foot-piece, with which it is difficult to maintain complete immobility during the period of nursing until the union is complete.

It has been realized that to get a perfect reduction of the majority of these fractures, greater extending force is required than was the custom to be used. To attain this and to maintain it, skeletal traction is a distinct help by pins, calipers or Kirschner wire. In compound fractures often it is the only possible method. For several reasons we definitely prefer the use of Kirschner wire inserted through the *os calcis*, with a horseshoe onto which extension is attached. It produces the least trauma and stands any weight required. It can be left in almost indefinitely without causing any infection in the bone as long as lateral play in the bone is prevented by attachment of flanges. It can be reinserted if required without fear of infection. We have found it safer as a routine procedure in a hospital where persons of all degrees of proficiency and experience may have to use a standard method. Much less damage can be done than with pins or calipers. We have not had any residual trouble from the use of wire. The wire may be inserted easily under local anaesthesia.

No less important than extension is: (a) the position of the limb with the knee flexed to relax the gastrocnemii, both during reduction and until union occurs; (b) anaesthesia to eliminate pain and muscle spasm during reduction. For the latter, though general anaesthesia is effective, we prefer as

a routine local anaesthesia, as it gives better relaxation, complete painlessness, a longer period to allow the various steps to be carried out methodically with X ray confirmation; it also avoids an unduly long ether anaesthesia. Local anaesthesia may be amplified with gas or ether if there is need of very strong extension which may cause pain in the ankle joint. We use 2% "Novocain" with adrenaline injected into the hematoma, about twenty cubic centimetres into both fracture sites, with due care for aseptic injection.

For the actual reduction when the fragments are displaced we use Böhler's frame with the knee in a flexed position. We use skeletal traction with screw extension which will give the required 40 to 50 pounds pull; we also carry out manipulation till reduction is clinically perfect and has been confirmed by X ray examination in two directions.

For fixation we then apply an unpadded plaster case from the toes to below the knee while the leg is on the frame, incorporating the traction wire in the plaster. It is essential to retain extension till union has occurred in any fracture with any degree of obliquity, as, when the swelling of the leg reduces, the leg becomes loose in the plaster and displacement and overlap may recur.

Particular attention must be paid to: (a) Avoidance of backward angulation of the fragments. (b) Rotation of the foot and lower fragment. (c) The extension pulling out the normal lateral curve of the tibia. This must be remoulded by pressure of the hand as the plaster sets, or else abduction of the lower fragment results. (d) Support of the toes by prolonging the sole piece of the plaster beyond the toes to prevent flexion contracture of the toes.

Skiagrams should then be taken to confirm the position. When the plaster has set, the screw traction is released and the leg is transferred to a bent Thomas splint slung to a Balkan frame, with a counterpoise to balance the upper end of the splint only and so to keep it applied during movements of nursing. Extension of about twelve pounds is applied, and the plaster is slung at the toes to avoid rotation. The amount of weight is reduced during the period of extension. A watch must be kept during the first twenty-four hours for swelling of the leg inside the plaster interfering with the circulation. Swelling is more likely to occur in fractures of the upper two-thirds, surrounded by bruised vascular muscle tissues, than in the lower third, where tendons are present. The indications are pain and blue, cold toes, and the remedy is splitting the plaster along the front. (In some cases, when swelling is considerable, this is best done at once.) Splitting does not affect the efficiency of fixation as long as the extension is maintained, but splitting must be complete along the whole length of the plaster or pressure necrosis may occur under the portion not divided. Extension of this plaster is kept on till union has begun, that is, three to four weeks.

Skiagrams should be taken through the plaster during the first week to see that there is no over-extension causing a gap (especially in transverse fractures). If this over-extension is allowed to persist, union of the fibula will occur and there is risk of non-union of the tibia. The remedy is to reduce the weight extension. Subsequent X ray examinations should be made every week till some union may be expected to have occurred, say in three weeks. Frequent radiographs are essential in plaster case treatment, if one is to avoid disaster. There is no other way of visualization of the position of the fragments. During the fourth week the leg is replaced on the Böhler frame, the plaster is removed and a new close-fitting plaster is applied. If union has become fairly firm on this occasion the pin is removed, the plaster is extended to the thigh, a walking attachment is added, and walking is encouraged with the aid of a stick only. Weight-bearing is beneficial for consolidation (as long as no sheering strain is involved). Incidentally the patient becomes an out-patient. The position after each plaster application is confirmed by X ray examination. This plaster remains on for from ten to twelve weeks from the date of fracture. If on removal the callus is painful or tender, the plaster is reapplied for a further period. If not, "Elastoplast" is put on up to the knee for two or three weeks to prevent swelling of the leg. It is important to see that the leg is actively used; crutches should not be allowed.

When the length of the limb is intact and extension is not required (for example, in a Pott's fracture, in malleolar fractures and in most single bone fractures, or in fractures without displacement) reduction can be effected by manipulation alone and a plaster case can be applied. In the majority of these fractures a walking iron may be applied within twenty-four hours, as soon as it is seen that excessive swelling is not developing inside the plaster and causing circulatory obstruction; walking is encouraged at once.

Compound Fractures.

In small wounds, even if there has been penetration of bone fragments without gross soiling, and if the patient is seen within twelve hours of the injury, we adopt excision of the wound and suture. When possible, the suture is in the line of the limb rather than transverse, as extension tends to pull open the latter. These cases are then treated as simple fractures.

In large wounds of severe compound fractures that are infected and that cannot possibly be excised and closed, we have modified the technique described. We adopt extension by skeletal traction with wire in the *os calcis*, the leg lying in a straight Thomas splint. A plaster slab is arranged over a part where the skin is intact to secure as much immobility as possible between the fragments; and at the same time the wound is left free for suitable

treatment until such time as a plaster case may be applied.

When infection of the bone ends occurs, we have made use of both of the following: (a) Winnett Orr's method in a closed plaster. This is applicable in many cases as long as drainage from the bone to the surface is free. If not, abscess formation will occur and burrow into the muscle planes, and this needs adequate drainage. This is evidenced by pain, rise in temperature and tenderness in the groin lymph glands. (b) In other cases a window is cut in the plaster case for drainage. Prolonged fixation in plaster is maintained till the sequestrum separates and good union has occurred.

Results.

This paper is based on eighty fractures of the tibia and fibula. Of these, forty are fractures involving the centre two-thirds of the shaft of both bones. The others include fractures of one bone only, malleolar fractures of both bones, Pott's fractures, fractures of the upper condyles of the tibia.

In the simple fractures, with the exception of one early case in which extension was obtained by a caliper and the point of insertion became infected, necessitating removal of the extension before consolidation, no patient has had more than a quarter of an inch of shortening, and only two or three have had as much as that. The vast majority have a leg with no appreciable difference from the normal.

We have on one or two occasions found one feature that we have not fully corrected, and that is the abduction of the lower fragment referred to above. In two compound fractures of both bones (one patient with a head injury, the other with *delirium tremens* during treatment) the anatomical result was not perfect, and the functional result was only fairly good. The functional result in all other cases has been good. There has been no case of non-union or of delayed union, with the exception of one case, that of a compound fracture with infection, in which it took twelve weeks for union to begin.

The time of returning to full work has averaged under four months, with the exception of the two cases referred to, and one other, that of a patient who had a fracture of the middle of the tibia and for a long period was attending the out-patient department, complaining of a painful ankle. When it was recognized that this was due to a light adhesion in the ankle joint, and when the adhesion was broken down by manipulation, the man was able to return to his work at once.

References.

¹ Report of the Committee on the Treatment of Simple Fractures. *The British Medical Journal*, Volume II, 1912, page 1595.

² Watson Jones: "Inadequate Immobilization and Non-Union of Fractures", *The British Medical Journal*, Volume I, 1934, page 936.

³ Lorenz-Böhler: "The Treatment of Fractures", Fourth English Edition, pages 2 to 12.

SOME OBSERVATIONS ON DIAGNOSIS AND PROGNOSIS IN GENERAL MEDICINE.¹

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WHEN asked to read a paper for this meeting, I hesitated to accept because I felt that I had nothing new to offer. In the desire to present something new there is a distinct danger that unwarranted claims may be made or conclusions drawn from incomplete observation, insufficient evidence or a failure to take into consideration all the factors involved.

No good purpose would be served by recounting diagnostic signs and therapeutic measures which have had their vogue and which have later been relegated to well-deserved oblivion. One might mention, in passing, the subclavian sign and the *palmaris brevis* sign, both of which for a time were regarded as being of diagnostic value in early pulmonary tuberculosis. One hears very little now of rectal injections of potassium permanganate in the treatment of pneumonia, and gold salts in pulmonary tuberculosis are not so extensively used as they were a few years ago.

At the same time it should be remembered that the way of the pioneer is not easy. Many of the greatest discoveries in medicine have at first been received with scepticism or even ridicule, and have been finally accepted only after much acrimonious debate. In this connexion one might recall the difficulties encountered and successfully overcome by men so justly famous as Lister, Jenner, Oliver Wendell Holmes and Semmelweiss.

Semmelweiss, an Hungarian student of Skodas, was first assistant in the obstetrical wards at a hospital in Vienna. He noticed that the mortality rate from puerperal infection was greater in the ward in which vaginal examinations were frequently done with unwashed hands by students who had come directly from the dissecting and *post mortem* rooms. He was also struck by the fact that the *post mortem* appearances in one of Rokitansky's assistants, who had died of a dissection wound, were similar to those seen in patients dying of puerperal fever. He concluded that the two conditions were of the same nature and that the students had carried the infection from the dissecting and *post mortem* rooms. Instructions were issued that they should wash their hands in a solution of chloride of lime before entering the obstetrical wards, with the result that there was a very big reduction in the mortality from puerperal infection. His views, when published, were received with ridicule, and Semmelweiss himself was subjected to abuse and even persecution. Some five years previously Oliver Wendell Holmes had

¹ Read at a meeting of the Victorian Branch of the British Medical Association on September 2, 1936.

expressed similar views, which, to say the least, were very unfavourably received by his colleagues.

The accumulation of knowledge is comparatively easy. The attainment of wisdom, or as it is called in medicine, clinical sense or clinical judgement, is infinitely more difficult. It comes from accumulated experience and reflection, by which is meant the careful examination and observation of the signs and symptoms of disease, followed through from its beginning to its termination in death or recovery. It means also a review of patients in the light of subsequent developments, and an attempt to place the right amount of significance on each of the observed facts. This method is applied consciously or unconsciously by every practitioner of medicine.

The late Sir James Mackenzie was very much impressed by the ability of his elderly partner, Dr. Briggs, to forecast what was going to happen to his patients. He found, however, that this knowledge was very largely personal to Dr. Briggs himself. His experience and his observations had not been sufficiently recorded and analysed to make them available and useful to others. Mackenzie resolved, therefore:

To make a series of careful observations entirely for my own improvement, never dreaming of research, for I was under the prevalent belief that medical research could only be undertaken in a laboratory or at least in a hospital with all its appurtenances. I only sought to find out something about the nature of my patients' complaints. I recognized that, when disease had made considerable ravages in the body, a moderately accurate diagnosis could be made, but in the vast majority of my patients there was no physical sign, or if there was a physical sign I was not sure of its relationship to the patient's ill-health.

At about this time one of his patients died suddenly during labour, and it was largely owing to this that he directed his attention particularly to heart disease. After years of careful and patient observation, watching what happened to patients with certain signs and symptoms, he was able to make very substantial additions to our knowledge of cardiology. In his opinion, the most important contribution he made was that the functional capacity of the heart was most reliably estimated by a careful consideration of the patient's response to effort as determined by symptoms. He regarded the invention of the polygraph as being of comparatively minor importance, and looked upon it as an instrument which had been useful in enabling him to obtain knowledge, rather than as a necessary equipment of a practising cardiologist. He was well aware of the fact, however, that if he had not invented the polygraph, his views would not have received the recognition they did. He said:

That polygraph of mine, and its rich relation the electrocardiograph, are now spoken of as instruments of precision, far superior to the finger of the doctor on the patient's pulse. Men without wisdom say that I have made cardiology scientific with these machines, so that unless you possess a machine, a whole battery of machines, you cannot take rank as a heart specialist. Think of it. And I have nearly abolished all instruments from my own practice.

The objection is not to the machine nor to the valuable additions to knowledge obtained by it, but to the attitude of mind which expects too much from it and which considers information obtained in this manner to be necessarily superior and more worthy of consideration than that obtained by ordinary clinical methods.

There is an apparent exactness as well as a certain air of mystery and magic about a complicated electrical device, an X ray examination, a basal metabolic test, or even a chemical or bacteriological examination, which appeals more to the imagination of the patient than a mere process of reasoning based on ordinary clinical observation.

Information obtained by special methods should be subjected to the same critical analysis and to the test of time in exactly the same way as that obtained by ordinary methods. It is only in this way that we shall be able to appreciate their full value, as well as to recognize their limitations.

The value of special methods is not questioned. An X ray film of the chest may reveal extensive disease, which cannot be detected by a careful and competent clinical examination, and in tracing the progress of a lung lesion serial X ray examinations are of the greatest value. In the diagnosis of gastric and duodenal ulcer, and to a still greater extent in chronic appendicitis, I believe that the clinical history is entitled to at least equal consideration with the X ray examination. Both gastric and duodenal ulcer may be difficult to detect on an X ray examination, and the appearances may suggest their presence when there is no organic lesion.

Numerous examples could be quoted illustrating mistakes in diagnosis resulting from too close adherence to laboratory and mechanical aids, and from paying insufficient attention to the history and clinical examination. On the other hand, the X ray specialist or laboratory worker often provides the clinician with a diagnosis which he little expected.

In a teaching hospital, where special examinations are so easy to obtain, there is a big temptation to rely too much on mechanical aids, and as a result the student may develop a false perspective and fail to cultivate the essential qualities of accurate observation and sound reasoning. Mr. Hamilton Russell once said:

We sometimes observe a man of high intellectual power, honest and painstaking, who seems unaccountably to fail. If I were asked to state in general terms what, in my opinion, is the most frequent defect that underlies this melancholy phenomenon, I should reply without hesitation: "Inability to distinguish clearly between the facts of the laboratory and those of the bedside."

I have always had a profound distrust of statistics. They can apparently be made to prove or disprove almost anything, particularly when applied to the solution of a complex problem. Despite numerous statistical studies, the relative value of medical and surgical treatment in gastric and duodenal ulcer still remains unsettled. In a series of 1,435 cases treated at the Peter Bent

Brigham Hospital it was concluded "that surgical intervention, in general, was less successful than medical treatment in warding off pain, hæmorrhage, obstruction, perforation, and hour-glass stomach". In a similar series quoted in *The British Medical Journal* several years ago a totally different conclusion was arrived at. So many factors are involved, such as the nature of the operation performed, the type of patient selected for surgery, details of medical treatment *et cetera*, that it is difficult to draw reliable conclusions from studies of this nature. On the other hand, I think much can be learned from one single case, carefully studied in all its aspects, and followed through its whole course. Let me illustrate. If a hundred people with either a systolic murmur or extrasystoles be selected at random, the mortality will be greater than in a similar number not showing either of these phenomena. This does not, however, entitle one to draw conclusions as to the prognostic value of either of these signs. Things which are associated with each other are not necessarily causally related.

Suppose, on the other hand, that one patient has been observed to present either one or both of these signs throughout a long life and ultimately dies of old age, then one is justified in assuming that neither of the signs mentioned is necessarily indicative of heart disease. Pathological laws do not alter, and any apparent exception means that some factor has been overlooked or has been given undue prominence. Loud systolic murmurs, although not in themselves indicative of heart disease, are more frequently found in diseased than in normal hearts; hence the suspicion with which they were at one time regarded.

Until quite recently I had under observation a patient whom I first saw about thirteen years ago. She had had rheumatic fever at the age of twelve, and when I first examined her she had typical signs of mitral stenosis. She has enjoyed at least average health and, for her age, her cardiac reserve is satisfactory. I think one may conclude from this that moderate grades of mitral stenosis do not necessarily impose a serious burden on the heart, despite the fact that most patients with mitral stenosis do not live the normal span of life.

Heart Conditions.

There is at the present time a tendency to attach too much significance to alterations in the form of the electrocardiogram. Waves of low amplitude, slurring and notching of the *QRS* complex, and inversion of the *T* wave are seen more frequently in diseased than in normal hearts. They have all, however, been observed in patients who have lived for many years, and are not necessarily indicative of myocardial damage. Branch bundle block is very frequently, but not invariably, associated with severe myocardial disease, so that its discovery should lead to a careful scrutiny of the cardiovascular system.

It should be recognized that the electrocardiogram may be quite normal in the presence of even severe heart disease. Many patients with *pulsus alternans* show a normal tracing.

From the standpoint of prognosis in heart disease, a clear distinction should be drawn between those phenomena which are themselves indicative of heart disease, and particularly of myocardial disease, such as persistent *pulsus alternans* and the presystolic type of gallop rhythm, and those which are more or less frequently associated with it. In the latter group are included low voltage waves, inversion of the *T* wave, systolic murmurs and extrasystoles. These should not be used prognostically, but are of value in directing attention to the heart, and, in patients in whom the symptoms are difficult to evaluate, they may be a factor in deciding between functional and organic disease.

In giving a prognosis in heart disease I believe that the most important points to decide are:

1. The functional capacity of the heart as determined by symptoms, and to a lesser extent the size of the heart. In young people, particularly those of nervous temperament, when there is a difficulty in evaluating symptoms they should be given the benefit of the doubt, provided the results of examination are satisfactory on other counts. In the elderly more caution should be exercised and the symptoms more often accepted at their face value.

2. Is the heart or the cardio-vascular system affected by some disease process which up to the present may not have caused sufficient damage to produce disturbance of function? The common conditions to be particularly sought for are rheumatic infection, syphilis and hypertension. Increase of cardio-vascular disease in these conditions is more often due to progression of the disease process itself than to failure of compensation for damage already done.

In acquired heart disease, mechanical defects, with the possible exception of severe grades of mitral stenosis and aortic regurgitation, do not play a material part in determining failure. In the individual case the valve defect is so often associated with myocardial damage that it is impossible to assign to each its due portion. The fact that quite extensive valve disease is sometimes compatible with long life would seem to indicate that, if the myocardium has escaped and remains free of infection, the prognosis is favourable.

It is quite otherwise with the severe defects seen in some cases of congenital heart disease. The significance of these is best assessed, not by the type of murmur or the nature of the lesion, but by their effect on the function and size of the heart, determined by careful observation over a period of years.

Toxic Goitre.

Typical cases of toxic goitre present very little difficulty in diagnosis. The thyroid enlargement with exophthalmos and bright eyes, the restless, alert patient with warm, moist hands, tachycardia

and tremor, constitute a very striking picture. If eye signs are absent and the thyroid is not obviously enlarged, the diagnosis may be difficult. The possibility of thyroid disease may not be considered and a diagnosis of arteriosclerosis, cardiac failure or diabetes may be made. The loss of weight may be the outstanding feature and latent malignant disease may be suspected.

On the other hand, a goitre may be present in a patient who is nervous in the popular sense and who presents the phenomenon of effort syndrome or neuro-circulatory asthenia, with marked tremor, irritability, nervousness, breathlessness on exertion, and tachycardia. If no thyroid enlargement were present, these symptoms would probably receive their correct interpretation, but in the presence of a goitre it may be difficult to decide whether the condition is toxic or not. Operation in these cases not only does no good, but may leave the patient worse off than before.

Diagnosis of this type may be exceedingly difficult. Clinically most reliance should be placed on the absence of signs and symptoms which depend on an increase in the basal metabolic rate. The hands and skin surface are cold and clammy and not warm and moist. The patients usually feel the cold weather and need plenty of blankets at night. The pulse pressure as a rule is not elevated. The sleeping pulse rate may be normal. The eyes are not bright. The general attitude of the patient is important. There is not the brightness, alertness, restlessness and unnecessary motor activity, such as are frequently observed in a toxic goitre. The appetite, instead of being normal or increased, is poor, and there is usually no loss of weight. Rarer toxic manifestations, such as itching of the skin, diarrhoea and pigmentation, are absent. The basal metabolic rate is a valuable help, provided it is remembered that many nervous patients find it difficult to adjust themselves to true basal conditions. If this adjustment is not made, then the result of the test may be most misleading. The patient should, if possible, rest the day before the test is made, and its nature and the manner of its performance should be explained. A first reading is more likely to be misleading than one done later, when the patient knows exactly what is required. In difficult cases it may be necessary to administer iodine for about a fortnight and watch the result. A definite fall in pulse rate and basal metabolic rate is very suggestive of toxicity, and if the diagnosis is considered to be sufficiently definite, operation can be proceeded with. In this group the big danger is that of diagnosing thyroid toxicity when it is not present.

In "masked hyperthyroidism", on the other hand, the symptoms may be largely cardiac in nature and the underlying goitre may be overlooked. Palpitation is usually a very prominent symptom, more prominent than in cardiac failure due to other causes, except perhaps in some cases of failure associated with aortic regurgitation and arteriosclerosis. The blood pressure is frequently elevated,

and it is very easy to attribute the palpitation and the shortness of breath to arteriosclerosis. Extrasystoles with a rapid heart rate are also common, an association not usually seen in other cardiac disorders. Anginal pain may be a symptom, but is not common. Auricular fibrillation, either paroxysmal or continuous, is not infrequent, and in advanced cases may be associated with the usual phenomenon of cardiac failure with oedema. The apex beat may or may not be displaced downwards and outwards, and the apex impulse is usually short and forcible, unlike the prolonged heaving impulse seen in long-standing hypertension. The first sound at the apex is short, sharp and high-pitched, sometimes simulating a presystolic murmur. The electrocardiogram may show that the amplitude of the P wave is increased, and this, combined with the sharp first sound, may lead to an erroneous diagnosis of mitral stenosis. At the same time it should be remembered that the basal metabolic rate may be elevated in advanced heart failure, with no thyroid toxæmia, particularly if dyspnoea be present.

The picture so far described differs little from that commonly seen in heart failure associated with arteriosclerosis and/or auricular fibrillation. There will, however, usually be some other evidence of the underlying thyreotoxicosis. Loss of weight, sometimes to quite a considerable degree, despite a good appetite, is very suggestive. Attacks of unexplained diarrhoea or even prolonged diarrhoea of a mild type may occur. The thyroid is usually, but not always, enlarged, and adenomata may be present. Even when not visibly enlarged, it may be felt, and there may be an alteration in consistency. Although exophthalmos is not common, von Graefe's sign is frequently present, and the eyes may have a glassy appearance. The temperature may be slightly elevated. Pigmentation of the skin is occasionally present. Pruritus is also a rare manifestation. Increased tolerance to cold and increased dislike for hot weather are valuable diagnostic symptoms when present. Most arteriosclerotic patients, on the other hand, prefer the warm weather. Tremor is practically always present, and there may be an unnatural alertness, a frequent performance of purposeful yet unnecessary movements, a "fidgetiness", and a nervous and apprehensive state, which together present a picture difficult to describe, yet not so difficult to appreciate when one is confronted with the patient. Muscular weakness, out of all proportion to the general ill-health, may be present. This may affect particularly the thigh muscles, so that difficulty in going upstairs or getting into trams or trains may be complained of.

The skin may be warm and moist, and flushing easily occurs. The basal metabolic rate is usually elevated, but as the condition is sometimes intermittent, with natural periods of improvement, the basal metabolic rate may at these times be normal. Digitalis therapy as a rule produces little or no benefit, and this may apply even in the presence of

auricular fibrillation; but iodine, with or without rest, usually results in considerable temporary improvement.

It is remarkable, even in patients with severe heart failure, how much improvement may occur after operation. Thorough and careful pre-operative medical treatment should be undertaken, and even with this staging of the operation may be necessary.

Thyreotoxicosis probably causes little or no permanent cardiac disease. It may accelerate an inherent tendency to hyperpiesia and arteriosclerosis. Permanent cardiac impairment persisting after operation is due in most cases to preexisting heart disease, usually arteriosclerotic or rheumatic. Unless these facts be appreciated operation may be denied to patients on the ground that the heart disease is too advanced to permit of its being undertaken.

Glycosuria may occur as a result of thyreotoxicosis, and true diabetes may coexist with it. It may be difficult to determine whether the patient is suffering from diabetes or from thyreotoxicosis or from both of these conditions. In the presence of glycosuria, increased appetite and loss of weight, it is easy to make a diagnosis of diabetes and to overlook the signs and symptoms of thyreoid toxæmia which may be present. According to Joslin, glycosuria occurs in about 30%, hyperglycæmia in 90%, and true diabetes in only about 3% of cases of hyperthyreoidism. The diagnosis of diabetes in hyperthyreoid states must therefore be made with caution. It is difficult to lay down hard and fast rules, but if in the presence of hyperthyreoidism the fasting blood sugar is above 0.15% and the blood sugar after the meal above 2%, then diabetes is probably present as well.

Brief mention might also be made of those cases in which one toxic sign or symptom, such as exophthalmos, loss of weight or diarrhœa, may precede the development of other evidences of toxæmia by quite a long period of time.

Fractional Test Meals.

The results obtained from fractional test meals have received a good deal of attention in the last few years. On the whole I have been disappointed with the assistance they have rendered, with regard to both diagnosis and treatment. The secretion of hydrochloric acid varies so greatly in apparently healthy individuals that one should hesitate to place too much significance on these variations. A repetition of the test in the same individual may give widely differing results. F. R. Vangart and some of his colleagues at the Mayo Clinic studied the gastric secretions in 3,000 patients who had no signs or symptoms of disorder in the alimentary system. They found that there was a steady increase in the incidence of achlorhydria from youth to old age. At the age of sixty, 28% of females and 23% of males had achlorhydria. At the New Lodge Clinic, of 2,500 gastric analyses done on patients

with some gastro-intestinal disorder, 13.7% showed achlorhydria. Similar results have been obtained by other observers, and it is evident that there is not a big difference in the incidence of achlorhydria in patients with and without gastro-intestinal symptoms.

It is doubtful whether achlorhydria of itself produces any typical symptoms, and in my experience the exhibition of hydrochloric acid, even in large doses, has not in most cases produced any great improvement. A small percentage suffer from morning diarrhœa, which is rapidly relieved by giving hydrochloric acid in doses of fifteen to twenty minims three times a day, amounts which would be quite inadequate to restore the concentration of acid to anything approaching its normal value. How achlorhydria produces diarrhœa is unknown. Rapid emptying of the stomach and intestinal putrefaction have usually been blamed, but gastric hurry often occurs without diarrhœa, and in gastrogenous diarrhœa no increased intestinal putrefaction can be demonstrated.

Many patients with achlorhydria have received more benefit from alkalis than from acid. Even in those cases of functional dyspepsia, in which improvement follows the administration of acid, it does not necessarily follow that the improvement is due to the acid. The psychological effect of a thorough examination, with the reassurance which it carries, and also the dietetic and other measures advised, would have to be taken into consideration. The giving of acid itself might also act psychologically rather than physically.

In both pernicious anæmia and idiopathic hypochromic anæmia the exhibition of hydrochloric acid, in addition to the appropriate specific remedies, liver and iron, does not hasten the improvement in the blood condition. Many patients find it difficult to take six drachms of acid per day, the amount now usually considered to be advisable.

Pernicious anæmia is so constantly associated with achlorhydria that one would hesitate to diagnose it if hydrochloric acid were present in the stomach. In gastric carcinoma the association of achlorhydria with lactic acid is of diagnostic value, particularly if, in addition, altered blood and pus are present. Much mucus is almost diagnostic of chronic gastritis. Apart from these conditions gastric analysis is not of very great diagnostic value.

The importance of achlorhydria has, I think, been exaggerated. Because two things are associated, they are necessarily causally related to each other. Indigestion associated with absence of hydrochloric acid is not necessarily due to lack of acid and is frequently not benefited by its administration.

Vaso-Vagal Attacks.

The term vaso-vagal was first used by Gowers and later by Kinnear Wilson to designate attacks characterized by transient disturbance of function

in organs chiefly supplied by the vagus nerve. These are distinct from the two common varieties of syncope attack, which are due either to "pooling" of blood in the splanchnic and peripheral vessels or to reflex vagal inhibition. The former of these two may occur in a variety of circumstances. The sudden assumption of the erect posture, particularly after a full meal, a hot bath, prolonged standing, being too heavily clad on a warm, close day, all of these, particularly if combined with some emotional factor, may induce a syncope attack, which is due essentially to cerebral anaemia.

Fainting turns due to reflex vagal inhibition may occur in the presence of robust health, although previous illness or ill-health acts as a predisposing cause. The sudden prick of a hypodermic needle, some violent emotional stimulus, the sight of blood, viewing an operation for the first time or witnessing an accident may induce an attack. The patient feels faint, the sight becomes dim, the pulse slow and feeble, the pupils dilate, the skin becomes cold and clammy, and consciousness is blurred and sometimes lost. The actual attack is soon over, although the patient may feel weak and tremulous for some hours. The term vaso-vagal is sometimes applied to these attacks, and the uncertainty as to what is meant by the term is probably the reason why it has not come into common usage.

The term vaso-vagal was used by Gowers and later by Kinnear Wilson to designate something quite different from either of the conditions just mentioned. The attacks about to be described are not at all uncommon, and must sooner or later come under the notice of all practising physicians. There is transient disturbance of function, not confined to the cardio-vascular system, although frequently involving it, and affecting in varying degrees vasomotor and vegetative mechanisms.

They occur most frequently in patients with a history of epilepsy, migraine or insanity in the family, although such a history is not present in all cases. The attacks, like those seen in epilepsy, occur at intervals, and in the individual patient may vary but slightly in their manifestations. In between the attacks the general health is usually quite good.

The attack often begins with some curious epigastric sensation. This may be a sinking feeling or a feeling as if the stomach has turned over, or simply a weak or uncomfortable feeling. Associated with this there may be trembling and shivering, often followed by a cold perspiration, which then gives place to a feeling of warmth and tingling all over.

Respiratory disturbances are common. There may be difficult, rapid and occasionally slow breathing, and sometimes a feeling of choking and suffocation.

Palpitation with a fluttering or thumping sensation in the chest is frequently complained of. Precordial pain simulating angina is rare, and,

when present, is usually atypical in distribution. There may be an expressed fear that something terrible is going to happen, even death itself. There is no loss of consciousness, but there may be a sense of unreality or a dreamy state similar to that seen in uncinete epilepsy. The patient may state after the attack that, although he was aware of everything that was going on, he felt unable to move or speak. At the completion of the attack large amounts of pale urine of low specific gravity may be voided.

There is much difference of opinion not only with regard to the nature of these attacks, but also as to their nomenclature. They may simply be referred to as "nervous attacks" or, if the cardio-vascular manifestations are prominent, as "vasomotor or pseudo-angina". A psychiatrist would probably regard them as being due to an underlying anxiety neurosis or some "conflict within the personality". Kinnear Wilson is inclined to look upon them as epileptic variants, and says that this view "does no violence to the facts and is consonant with what we know of epileptic manifestations otherwise".

Although little is definitely known as to the cause and nature of these attacks, their recognition is of some clinical importance, particularly from the standpoint of prognosis. Recovery from individual attacks is invariable, although in severe attacks the condition of the patient may be truly alarming.

The diagnosis depends chiefly on the history of previous attacks, with recovery, and the absence of any signs of organic disease. In some cases, but by no means all, there is evidence of an unstable nervous system or a history of migraine, of epilepsy or of insanity in the family.

The main points in treatment are reassurance of the patient, attention to the general health, adjustment, if possible, of any mental difficulty or conflict, and the administration of bromides and "Luminal" over a prolonged period.

"Salyrgan" in Heart Failure.

In the treatment of heart failure with oedema "Salyrgan" is a valuable addition to our armamentarium. It is usually considered to be inadvisable to use it if the renal function is unsatisfactory, if the urine contains blood, or if there is any evidence of colitis. I have occasionally used it cautiously even in the presence of one or more of these contraindications when other methods have failed to relieve the oedema, and have so far not had cause to regret this. It is usually more efficacious if given in combination with ammonium chloride, but since this usually causes a good deal of gastric discomfort, "Salyrgan" alone may be tried first and is frequently effective. Even after all visible oedema has disappeared there may still be a moderate amount of latent oedema in the liver, lungs and alimentary canal, and unless this be removed the full benefit of the drug will not be obtained. Increase of weight gives warning of return of

œdema before there is any external evidence of it, and is an indication for further injections of "Salyrgan".

In patients with cardiac asthma or nocturnal dyspnoea, in whom there may be little or no visible œdema, but some hepatic and pulmonary congestion, marked symptomatic benefit is sometimes obtained from two or three injections of "Salyrgan".

Administration of Iron.

In the treatment of hypochromic low colour index anæmias, iron in adequate doses should be given by mouth. Bland's pill, 20 to 25 grains three times a day, or iron and ammonium citrate, 30 grains three times a day, are quite satisfactory preparations. Expensive proprietary products, although effective, are not necessary, and are often prescribed in inadequate amounts. Iron cannot be given satisfactorily by injection. When given by this route the toxic dose approximates too closely to the therapeutic dose, yet expensive proprietary preparations for injection are freely advertised.

It is doubtful whether iron and liver pills or tablets serve any useful purpose. They carry with them the suggestion that it is not necessary to determine the type of anæmia present, and, unless given in huge numbers, do not contain a sufficient amount of either ingredient to be really effective.

Acute Pyelitis.

Few diseases respond more readily to medical treatment than the condition known as acute pyelitis, but which, strictly speaking, is a pyelonephritis. It is not always sufficiently appreciated that the urine should not only be made alkaline, but kept alkaline throughout the whole twenty-four hours. In the early stages citrate of potash should be given in doses of 60 grains every two or three hours during the day and once or twice through the night. The urine should be frequently tested to make sure that it is being kept alkaline. In addition, the patient should be encouraged to drink large amounts of fluid up to six or eight pints per day. The alkaline treatment should be continued for two or three weeks after the temperature has fallen, and then hexamine should be given for two or three months. If this is done, the liability to recurrence is considerably lessened.

Spontaneous Subarachnoid Hæmorrhage.

Spontaneous subarachnoid hæmorrhage, although not a common disease, occurs with sufficient frequency to make it of clinical importance. It is usually due to rupture of either a congenital aneurysm or a congenitally weak vessel about the circle of Willis. In most cases it can be diagnosed with a fair degree of certainty on the history and clinical examination. The onset is characteristically abrupt, with severe headache. The temperature is at first normal or subnormal, but after about twenty-four hours there is usually a slight or moderate pyrexia. Signs of meningeal irritation with stiff neck and Kernig's sign appear in a few

hours. The mental condition will depend on the amount of blood extravasated. It may be quite clear or there may be drowsiness or coma. In some cases the mental state is similar to that seen in *encephalitis lethargica*. Signs indicating involvement of the ocular nerves or pyramidal tracts may be present. The clinical picture will vary according to the amount of blood extravasated, and its distribution, but in a large percentage of cases the diagnosis is suggested by the sudden onset followed by signs of meningeal irritation. Lumbar puncture yields evenly blood-stained cerebro-spinal fluid.

The Treatment of Pneumonia.

The treatment of pneumonia has probably been more written about and discussed than that of any other acute disease. Despite numerous statistical studies, there is still considerable difference of opinion with regard to the relative worth of the various measures employed. If statistics are to be really reliable, they should compare the mortality in two series of patients of the same age, of the same degree of physical fitness, infected with the same type of organism, having a similar degree of lung involvement, and treated in all respects in a similar way, except for the particular measure under investigation. In actual practice it is difficult to fulfil these conditions, and we are therefore forced to form our impressions from the careful study of individual cases.

Time does not permit a full discussion of the treatment of pneumonia. I merely wish to mention a few points which I believe to be important, fully realizing that the impressions I have formed may not agree with those of others. It is essential that the patient should have an adequate amount of rest. This means that he should not be subjected to unnecessary examinations of the lungs. Enemata should not be given unless there is some abdominal distension or discomfort. If sufficient sleep is not being obtained and milder sedatives are not effective, there are very few contraindications to the giving of morphine. A good night's rest is more beneficial than the indiscriminate injection of stimulants, many of which are of doubtful value. Fluids and glucose should be given freely, but there is no necessity to force the patient to take more food than he can comfortably manage.

Oxygen should be given too early rather than too late, and is best given by means of a tent or nasal catheter rather than by a funnel.

Stimulants are best withheld until the later stages, when alternating injections of pituitrin and adrenaline, with perhaps "Coramine" in addition, may be of some value.

Serum in Type I and to a less extent in Type II pneumonia is of definite value if given early in the course of the disease.

Conclusion.

I am only too conscious of the fact that I have introduced nothing new in this paper. Success in medicine, not merely in the material sense, but in

the actual diagnosis of disease and alleviation of human suffering is, I believe, achieved, not so much by the accumulation of a mass of knowledge, as by the development of a sound clinical sense, a clear appreciation of the relative worth of the bedside examination, and the facts of the laboratory, and a full realization of the importance of the psychological aspects of disease.

Knowledge is comparatively easy to attain, wisdom is more difficult, but understanding is most difficult of all.

THE MODERN TREATMENT OF SQUINT AND THE PREVENTION OF BLINDNESS.¹

By J. BRUCE HAMILTON, F.R.A.C.S.,
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THE prevention of blindness is at last receiving the attention it has long deserved. International associations for the prevention of blindness and against trachoma have recently come into being, and this year the Standing Committee on the Prevention of Blindness of the Union of Counties' Association for the Blind (1936) has issued a comprehensive report on the prevention of blindness in Great Britain. This report, together with that issued by the same body on hereditary blindness (1933) has adequately paved the way for an Empire campaign against blindness. Best (1934) estimates that over 70% of the blindness in the United States of America is preventable; and my estimate in Tasmania, taken quite independently, is 63% (1936). Of course this estimate includes blindness from hereditary eye diseases of many types, and with this I shall deal in a later and longer communication. It suffices here to say that from one-quarter to one-third of the world's blindness is caused by hereditary eye diseases alone.

While it is easy to say that 70% or even 63% of blindness is preventable, it is quite a different matter to bring about its prevention. So many varied factors are involved. Tonight I would speak to you for a few moments about the most potent cause of monocular blindness, which at any time in life may be converted into binocular blindness if disease or accident affects the second eye. The loss of vision in one eye, which in itself is not such a distressing fate, nevertheless leaves the patient in too vulnerable a position. Therefore, the prevention of monocular blindness should receive our attention at all times.

The modern treatment of squint—the subject under discussion—should be sight-saving in the first place, and only secondarily cosmetic. The cosmetic result has always been and will always be uppermost in the lay mind, for there is supposed to be ill-luck attached to meeting cross-eyed people;

further, cross-eyed children at school are giped at by their fellow pupils to such an extent that they develop an inferiority complex and seldom make their mark in after-life. But the sight-saving principle is the one which primarily concerns present-day ophthalmologists, for the loss of sight in the squinting eye is unnecessary and preventable if the patient is taken in hand before he is six years of age. I should like to stress this age limit at once—it is of paramount importance. After this age the amblyopia can in some cases be corrected, but the process is most tedious.

Although such great names as Donder, Javal, and Priestly Smith will always be associated with the early work on strabismus, yet these men had only a vague notion of the principles involved. They ordered glasses when they considered the child old enough to wear them; they sometimes operated with uncertain results, and sometimes advised the parents to wait until the child grew out of the condition. The outcome of this "wait and see" principle was invariably a "wait and not see" result. The squinting eye became amblyopic and remained so. If the squint straightened after puberty, the amblyopic eye invariably remained blind throughout life. Let me give a cogent example:

A male, aged thirty-six years, had a right concomitant convergent strabismus thirty or more years before. His right eye had been straight for the past ten years, but had always been very defective in sight. An accident to the left eye occurred at his work, with complete loss of vision in this eye. The right amblyopic eye, with $\frac{1}{20}$ vision, sufficed for the cruder functions of life, but he was unable to read or carry on any occupation for which eyesight was essential. A quite unnecessary disaster.

The work of Claude Worth (1929) we must honour. He it was who commenced the modern treatment of squint, when at the beginning of the present century he urged the early treatment of squinting children. He asserted, and correctly so, that if the amblyopic squinting eye of children under six years of age was made to work, the vision would return rapidly. This could be effected by the continuous occlusion of the non-squinting (fixing eye), and the stimulation of sight in the squinting eye. Of course he insisted, as Donders and others had done, that first the refraction must be estimated in all cases and, whenever necessary, glasses ordered. But by this simple principle of occlusion of the fixing eye, Worth has saved the sight of many thousand eyes; it appeared so simple that many scoffed at it and said that the amblyopia was usually congenital. This is not so, and Barrett (1936) is of the opinion that congenital amblyopia is extremely rare, in which statement I concur.

Following the patient's recovery from amblyopia, Worth advocated fusion exercises to stimulate binocular vision. He postulated that squinting was caused through lack or loss of fusion and that, therefore, it must be stimulated and reeducated. He invented the Worth's amblyoscope with interchangeable transparencies for training, but unfortunately his amblyoscope failed, for the training was left to

¹ Read at a meeting of the Tasmanian Branch of the British Medical Association on October 13, 1936.

parents, who either did not understand or were too occupied otherwise to carry out instructions. The results from amblyopic training were poor and the principle was derided.

Other surgeons, if the deviation was still present after refraction, resorted to operation with surprisingly poor results, as will be shown later. The operations of tenotomy and advancement were those principally favoured. Advancement by itself was limited in its usefulness, but combined with tenotomy it corrected deviations up to 45°. However, the results were uncertain, because tenotomy meant cutting free one muscle and allowing it to reattach itself to the globe or orbital tissues whenever this was possible. With the introduction of recession in place of tenotomy it was hoped that the results would be more certain; but still many post-operative results were far from satisfactory, especially in cases of abnormal correspondence and suppression, as indicated recently by Pugh (1936).

Although fusion exercises fell into disrepute in England, yet from 1901 to 1925 Rémy continued the work in Paris, at the Hôtel Dieu. Since then, Cantonnet (1934) and his fellow workers have elaborated Rémy's technique and have stressed the importance of mental effort. The importance of this in orthoptic technique cannot be too forcibly stressed.

In 1929, Maddox, of Bournemouth, in conjunction with his daughter, revived the Worth fusion theory; he placed in the hands of ophthalmic surgeons two excellent instruments—the synoptophore (or synoptoscope) and the cheiroscope—and he advocated fusion training by skilled technicians. The idea was quickly grasped by ophthalmologists throughout the Empire, and by the end of 1933 there were clinics for fusion training from London to Hobart.

It soon became apparent that only the most elementary principles of binocular vision were understood, and that enormous obstacles stood in the way. It was found that many patients, having learnt to suppress the vision of the amblyopic eye, continued to do so even when amblyopia had been overcome; and so the cerebral anomaly of suppression had to be eliminated also. Cantonnet (1934) quotes Rémy in describing suppression (neutralization) as "the devil"; and rightly so.

Also it became apparent that squinters, and especially alternating squinters, developed abnormal correspondence of retinal points, that is, the squinting eye accepted an image at a point in its retina other than the macula in order to fuse with the macular image of the other eye. Pugh (1934 and 1936) states that 77% of alternating squinters and 17% of patients with monocular squints develop this defect.

Thirdly, it was found that mental effort could not, or would not, be exerted by all children. Some even up to the age of six or seven years refused to cooperate, while others of three and four years threw themselves whole-heartedly into the work.

Much experimentation has been tried to overcome these three great obstacles. It is sufficient here to say that suppression (neutralization) can be overcome by movement over the suppressed area, with reduction of the vision of the good eye by blurring of the lens and increase in the illumination of the suppressing eye; by using separators at a later stage; and, finally, by bar reading. Abnormal correspondence likewise can be overcome by stimulating the squinting macula for binocular vision, but it is extremely difficult. Travers (1936) considers cases with abnormal correspondence hopeless, but this view is not confirmed by Pugh (1936). The lack of mental effort has also been partially overcome by introducing more attractive transparencies, in the form of nursery rhymes and fables in bright colourings.

Even so, there comes a stage in the training when further advance is impossible. Usually, second grade binocular vision (fusion) has been restored, and sometimes partial stereopsis, but the angle of deviation remains stationary, because the contracted muscle has been stretched to its limit. Then operation, if resorted to, is followed by renewed exercises, but with final results much better than those obtained by operation alone. The pre-operative exercises have awakened a taste for binocular vision in the patient, and such taste can be further developed after operation. Often third grade binocular vision can be obtained. Once this is accomplished and firmly established, nothing but complete disruption affects the result.

Pugh (1936) analysed the results from various methods of treatment, and her findings were as follows: Eyes straight from operation alone, 8%. Eyes straight from exercises alone, 38%. Many patients in whom exercises alone had failed, as well as other patients, were operated on, and then exercises were resumed. This resulted in straight eyes in 42% of the failures and of the other patients. Eyes obtaining fusion with amplitude from operation alone, 12%. Eyes obtaining fusion with amplitude from exercises alone, 64%. Again many of those in whom exercises alone had failed and other patients were operated on, and then exercises were resumed. This resulted in 85% of the failures and of the other patients obtaining fusion with amplitude.

Tonight I have displayed many of the more modern instruments employed in orthoptic training, and this paper will be followed by a demonstration of each.

Before closing let me quote first from the 1936 report on the prevention of blindness of the Standing Committee on the Prevention of Blindness of the Union of Counties' Association for the Blind in the Great Britain. In portions of paragraphs 89 and 90 is the following comment:

In too many cases squints are first seen by an ophthalmic surgeon at too late a stage for successful treatment. It is not generally known that a squinting eye is usually blind (amblyopic). In certain of such cases vision may be materially improved by suitable treatment. It is the

general opinion that such treatment is useless unless begun at an early age, and in any case not later than at seven or eight years. A squinting eye may be put straight by operation at a later age, but this does not restore the vision. Since an amblyopic eye increases the danger of blindness, should the remaining eye sustain an injury or become affected by disease, there is a strong argument for making every effort to preserve or encourage the capacity of vision in the squinting eye. The establishment of a number of orthoptic clinics by hospital or by health or education authorities is evidence of the greater attention that is being paid to the training of squinting children by orthoptic exercises.

And, secondly, let me quote from the eighth edition of Sir John Parsons's "Diseases of the Eye":

It [orthoptic treatment] has one overwhelming argument in its favour, *viz.*, that when successful it cures the squint. The cure is complete, *i.e.*, the patient is placed in the same condition as a normal person; his eyes are straight and he has binocular vision. No other treatment can be said to cure the disorder. The eye can be put straight, but this cures only the deviation; the other element of the disorder remains unaffected.

In closing, I wish to stress four points worthy of memorization:

1. All patients with squints should commence and persist with treatment before they are six years of age, and before five years for preference.
2. Blindness of the squinting eye can be obviated by occlusion, especially if the treatment is commenced before the patient is six years of age.
3. Orthoptic exercises are the ideal treatment, but they are always a slow and time-expending method. Often for lack of time they must be supplemented by operation. Mayou recently pointed out that parents expected their children to take years to play the piano and days to acquire fusion of vision. This is unreasonable, as both are bound up in the same principle—education.
4. Cures obtained by orthoptic treatment are permanent, both visually and cosmetically. We must therefore continue to strive and experiment until perfection in technique is obtained.

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THE OPERATION OF CEREBRAL DECOMPRESSION AS PRACTISED BY THE NATIVES OF NEW BRITAIN FIFTY YEARS AGO.

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How the forward march of civilization was responsible for the cessation of the important surgical procedure of cerebral decompression or modified trephination among natives of New Britain, off New Guinea, makes a highly interesting and informative contribution to medical history, apart from its anthropological considerations.

Until fifty years ago slingstone warfare was one of the convenient means of settling intertribal differences between natives of the Blanche Bay district, which lies in the north-eastern corner of New Britain. The ovoid stones, usually about two inches in their greatest length, were thrown with great force and often reached their objective after travelling about thirty yards. Consequently varying amounts of cranial damage were sustained and frequently the trauma involved cerebral tissues. Invention followed in the steps of necessity, and the operation of cerebral decompression or modified trephining provided relief for depressed fractures. Prohibition of the use of slingstones followed soon after the advent of German officials, and removed the cause and the need for the operation, which was performed in this district only.

For these facts and details of the operation I am indebted to Mrs. Parkinson, of Kavieng, who has lived in New Britain for fifty-six years, and who has actually witnessed the operation. Before proceeding to describe the *modus operandi* I must stress that the operation had a definite surgical indication and was not done for any other purpose, such as the relief of headache or to permit the egress of "spirits".

Description of the Operation.

The doctor (*tene a babait*—literally one who is skilled in "healing") carefully washed the wound, situated usually in the frontal or parietal regions, occasionally in the occipital bone, with young milk (*tirip*) from a Makadao coconut, which has a green skin. *Tirip* is secured from a very young nut; that from an old nut is called *lama*, *kulan* and *kubika* being intermediate. Next, the skin was cut in the manner illustrated (Figure I) with a bamboo knife (*vi*), made out of split bamboo (*kaitai*). Then the skull was scraped around the wound with a *coto*, of which there are two kinds: (i) *coto tuna*, bought from Kabaira Weberhafen natives and supposed to be found in the rivers there; and (ii) *coto*, a black stone from "lightning stone" (? meteorite). After that, a thin bamboo pipe (*kaur*), about fourteen inches in length, was used to blow inside the wound. This enabled small pieces of bone to be detected. It was considered that if the patient felt pain on a part on which the doctor was blowing, frag-

ments would be located in that area. These were removed by forceps (*kia*) made from two pieces of coconut shell, four to five inches in length, half an inch wide, and bound together at one end. The scraping and blowing were continued until all fragments were removed, the wound being continuously washed with *tirip*. The skin was then coapted, the suture material being *taoja* or *aojaaja*, which is a very strong silk-like thread. It is made from banana fibre in the following way: After peeling the outer skin, the shoot is split lengthways, the inside well scraped and then dried in the sun. The cleaned, sharpened wing-bone of the flying fox was utilized as a needle (*takam*).

Now the wound was ready to be dressed. First a *tagete* leaf was applied and over that was laid *palapalao*, the outer layer of the banana flower. Then *meme na bnai*, a mixture of pepper, lime and very soft young betel nut (*aimim*), which had been chewed together, was spread over the leaves to exclude air. The entire head was covered with taro leaf (*kumu*) and big round leaves of a bush (*paba*), and finally fitted into a firmly woven frame (*malan*), which is made from *ratang*.

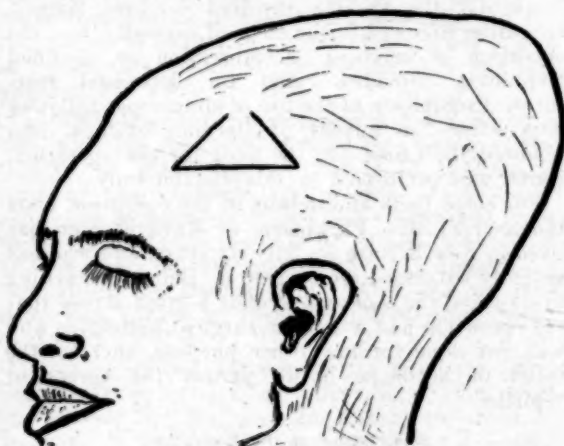


FIGURE I.

Post-operatively, the patient was given soft food to eliminate movement of the jaws and to keep the head quiet, so as to avoid disturbing the wound. For three days the patient remained quiet, then the frame was removed and the dressings were taken down. If there was pus inside, and if the man complained of pain causing him restlessness at night, the thread was cut, the operation repeated and a fresh dressing applied. After a week or more, if no pains were experienced, the patient was given a piece of old coconut (*lama*) to chew. Should no pain be felt, this was taken to indicate that there were no more fragments and that the wound was clean and healing.

Technique in Complicated Cases.

When the brain was slightly damaged, trephining was performed, traumatized portions were extracted

with the *kia*, and the hole was plugged with a piece of *mal* made out of *paka*. This was retained permanently. Another *mal* was wrapped over the wound and left until the wound healed. The first *mal* is reddish when worked, and its source has been indicated. The other *mal* is pure white and is secured from a tree, *mal tuna*. The bark is scraped off and the stick well pounded to loosen a kind of soft cord inside; this is pulled out and the stick pounded into a broad strip, which may be joined to other pieces with the sap of the same tree and then dried in the sun.

Not all cases were subjected to operation. When extensive damage was encountered, the doctor refused to operate. In complicated cases, that is, with cerebral trauma, it was found that the man, on recovery, became strong and healthy, and worked as if he had had no injury. Yet most, if not all, of those who recovered after partial cerebral excava-tion showed mental stigmata. They were below normal—"they become mad (*long long*), their speech is silly and they act in a funny manner".

Mrs. Parkinson informed me that she knew of a man who outlived the simpler surgical manoeuvre (both operations were performed without anaesthetic of any description) by thirty years. She thought that this was exceptional and that there were few recoveries, but she could not supply any statistics.

A Comparison.

Before concluding this account it is interesting to compare and contrast the New Britain methods with those of contemporary New Caledonians, as reported by G. Nicolas and summarized by Ruffer.⁽¹⁾ In New Caledonia the principal indication for the operation was persistent headache and not trauma. Crucial incisions were made and the bone was filed away with a cutting and sharpened shell. In the matter of dressings there is one point of similarity, for chewed herbs were placed on the cutaneous flaps when these had been turned back, and a shell was used to cover the bony deficiency. Nothing corresponding to the elaborate dressings of the New Britains is described.

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THE COLORIMETRIC DETERMINATION OF CREATININE IN URINE AND BLOOD WITH 3,5-DINITROBENZOIC ACID.¹

By ADOLPH BOLLIGER, Ph.D., A.A.I.C.

(From the Gordon Craig Urological Research Laboratory, Department of Surgery, University of Sydney.)

HITHERTO only one convenient reaction for the determination of creatinine was known, namely, the colour reaction with picric acid, as discovered by

¹Read at a meeting of the Section of Pathology and Bacteriology of the New South Wales Branch of the British Medical Association on August 4, 1936.

Jaffé in 1886. This method is not highly specific for creatinine. In a recent communication, however, I have shown that 3,5-dinitrobenzoic acid in an alkaline medium gives with creatinine a purple colour reaction which was found to be useful for the detection and determination of this substance.⁽¹⁾ Benedict and Behre independently discovered the same reaction and presented an extensive paper on this subject⁽²⁾ for publication only a few weeks after my preliminary report had been received by the publishers. The results obtained in the present paper were submitted to *The Journal of Biological Chemistry* on May 20, 1936. The paper was returned unpublished. Though I have studied the paper by Benedict and Behre, published in June, 1936, the results now to be described are the same as those offered for publication in America last May. In the present paper the application of this reaction to the determination of creatinine in urine, blood and spinal fluid is discussed.

Reagents.

For this colorimetric determination the following reagents are necessary.

1. A 10% solution (approximately) of 3,5-dinitro-sodium-benzoate. This is prepared by adding slowly under constant stirring 20 cubic centimetres of 0.5 N sodium hydroxide to 2.2 grammes of 3,5-dinitrobenzoic acid. Most of the dinitrobenzoic acid goes into solution, which is filtered when it has become practically colourless.

In order to get a satisfactory solution, the 3,5-dinitrobenzoic acid used has to be of high purity. It is best prepared by nitration of chemically pure benzoic acid, according to the method of Shukoff.⁽³⁾ The heating on the sand bath has to be stopped as soon as the nitrous fumes are driven off. Then the dinitrobenzoic acid formed is allowed to crystallize out from the sulphuric acid solution. The dinitrobenzoic acid is separated from the mother liquor by filtration. A funnel containing a fritted glass plate is most convenient for this operation. Then the crystals are transferred into about ten volumes of water and filtered again. Fifty grammes of benzoic acid yield about forty-five grammes of dinitrobenzoic acid. This product now has to be recrystallized from glacial acetic acid at least three times. The test for satisfactory purity is as follows: Add to 2.0 cubic centimetres of water 0.8 cubic centimetre of the dinitro-sodium benzoate solution and 0.4 cubic centimetre of normal sodium hydroxide. The mixture should remain practically colourless. If a brown tinge appears, the dinitrobenzoic acid has to be further purified.

2. Normal sodium hydroxide.

3. Stock standard 0.1% solution of creatinine. Dissolve one gramme of creatinine in one litre of 0.1 normal hydrochloric acid.

4. Dilute standard creatinine solutions are prepared by diluting with water after neutralizing the hydrochloric acid present in the stock solution. These dilute standards of neutral reaction do not keep and have to be made fresh daily.

Procedure in General.

Transfer two cubic centimetres of the fluid to be examined, which preferably should be colourless and of neutral reaction, to a test tube and add 0.4 cubic centimetre of a 10% solution of 3,5-dinitro-sodium benzoate and 0.4 cubic centimetre of normal sodium hydroxide. In another test tube treat 2.0 cubic centimetres of the standard solution in the same manner. After letting the two test tubes stand in the dark for ten minutes compare them in a colorimeter. If the creatinine is present in a concentration of more than five milligrammes *per centum*, immediately after the sodium hydroxide is added a purple colour will appear which deepens considerably after further standing. After about fifteen minutes it will begin to change towards red, and after about thirty minutes it will begin to fade. Ultimately it will become yellow. With smaller concentrations a more reddish colour will be obtained, which may take a few minutes to appear. In this case, wait fifteen minutes before reading.

It is essential that the depth of colour in standard and unknown differs by not more than about 50%. To insure this it is well to prepare more than one standard with each test.

By this test the presence of 0.2 milligramme of creatinine may still be detected and estimated.

Determination of Creatinine in Urine.

The reaction of 3,5-dinitrobenzoic acid with creatinine is readily applied to the determination of creatinine in urine. However, one has to bear in mind that best results are obtained with creatinine concentrations of from two to fifteen milligrammes *per centum*. Therefore, concentrated and highly coloured urine has to be diluted from ten to twenty times to obtain results within the range mentioned. With this dilution it is usually possible to avoid interference due to the colour of the urine. Very dilute and usually correspondingly pale urine with low creatinine content should be diluted only about five times in order to obtain a sufficiently strong colour.

Determination of Creatinine in Blood and Spinal Fluid.

According to the method described in this paper the creatinine content of normal blood ranges below 1.0 milligramme *per centum* (Table I). Therefore, the usual 1 in 10 dilution of blood filtrates is unsuitable for the determination of normal or moderately raised creatinine values because the smallest amount that can be estimated is about 0.2 milligramme *per centum*. Consequently, undiluted ultra-filtrates are most desirable. In the present investigation no such filtrates were used. However, numerous determinations were made on normal undiluted spinal fluid, which may be considered as some form of biological ultra-filtrate. In every instance a colour was obtained which could be compared against a creatinine standard of suitable concentration. According to this method, normal spinal fluid possesses a creatinine content varying from 0.4 to

0.8 milligramme *per centum*. In cases of renal insufficiency the values are increased accordingly (Table I).

TABLE I.

Colorimetric Creatinine Determinations in Spinal Fluid and Human Blood.

Medium.	Results Obtained with—		Blood Urea. (Milligrammes.)
	Dinitrobenzoic Acid. (Milligrammes.)	Picric Acid. (Milligrammes.) ⁽¹⁾	
Spinal fluid, undiluted:			
1	0.7		
2	0.8		
3	0.6		
4	0.4		
5	0.5		
6	0.5	0.7	
7	0.4	0.6	
8	0.6	0.7	
9	0.7	0.8	
10	5.9	6.0	310
Concentrated serum filtrate:			
1	0.8	1.3	35
2	0.7		
3	0.7		
4	0.9	1.6	32
5	0.5		
Whole blood filtrate, 1:1:			
1	0.6	1.2	34
2	0.8	1.4	40
3	0.5	1.3	
4	0.4	1.2	
5	No colour	1.1	32
6	2.4	2.6	118
7	2.9	3.3	182
8	5.8	5.9	276
9	13.0	13.2	375
Whole blood, tungstic acid filtrate, 1:5:			
9	13.1		
10	2.0	2.6	86

Also filtrates of blood serum were prepared which were diluted only about 20% as compared with the original serum. They were obtained by adding about 0.4 gramme of solid trichloroacetic acid to 5.0 cubic centimetres of serum. After being shaken well, the mixture is centrifuged and the supernatant fluid is drawn off and neutralized with sodium hydroxide, litmus paper being used as indicator. Five specimens of normal serum with filtrates prepared in the manner described were found to contain from 0.5 to 0.9 milligramme of creatinine. The colours produced by the addition of dinitrobenzoic acid and sodium hydroxide are typical of those produced by creatinine.

However, these concentrated serum filtrates are not suitable for general use, and for ordinary determinations trichloroacetic acid filtrates may be prepared by adding one volume of approximately 2 N trichloroacetic acid to one volume of whole blood. These filtrates have to be neutralized with about 2 N to 4 N sodium hydroxide (indicator, litmus paper). An amount of water corresponding to the amount of sodium hydroxide added for neutralization to the unknown has to be added to the standard.

Otherwise the procedure is as outlined. The results obtained by this method with whole blood seem to be about 0.1 to 0.2 milligramme *per centum* too low, judging from recovery experiments in which known amounts of creatinine have been added to blood. Partly for this reason and partly on account of the additional dilution of the filtrate by neutralization with sodium hydroxide, many specimens of normal blood give no colour at all or only a faint colour. Such findings are interpreted as a low normal creatinine value. Other specimens obtained from persons known to have normally functioning kidneys develop a colour which can be read and which may indicate as much as 0.8 milligramme *per centum* of creatinine. Any value obtained by this method above 0.8 milligramme *per centum* is considered to be definitely pathological, and all blood with urea retention gives under these conditions a colour which can easily be compared against a suitable standard and which is above 0.8 milligramme *per centum*. Tungstic acid filtrates have the advantage of being practically neutral. However, filtrates of a higher concentration than one in five furnish considerably too low results. On the other hand, by preparing a filtrate of one to five dilution, no colour is obtained from blood with normal creatinine content, but a moderately raised creatinine content, for example, 2.0 milligrammes *per centum*, is easily recognized in such a filtrate and can be read against a suitable standard. These filtrates were prepared by adding one volume of blood, three volumes of a solution containing 1.5% anhydrous sodium sulphate and 1.4% sodium tungstate, and one volume of $\frac{1}{3}$ N sulphuric acid.⁽⁴⁾ According to Benedict, tungstomolybdic acid filtrates of one in five dilution were also found to be satisfactory. It may be said that if one obtains a colour with these filtrates (dilution one in five), creatinine retention is present.

If a colour is obtained with an ordinary filtrate (dilution one in ten) pronounced creatinine retention is present.

Discussion.

Benedict and Behre propose as reagent for the determination of creatinine an alcoholic solution of dinitrobenzoic acid.⁽²⁾ After trying both, I prefer a watery solution of the sodium salt of dinitrobenzoic acid. Without any special precautions such a solution keeps almost indefinitely and it furnishes a colourless blank. On the other hand, the alcoholic reagent furnishes a slightly more purple and more stable colour in blood filtrates. With concentrated blood filtrates, undiluted spinal fluid, as well as urine, both reagents, however, furnish colours which can be compared with those obtained in a similarly prepared standard solution. Benedict and Behre⁽²⁾ found that human blood filtrates yield with the dinitrobenzoic acid method a colour so different, both in shade and stability, from that given by creatinine that the chromogenic substance in such filtrates can-

not be considered to be creatinine. But, judging from my experience with this test, I believe that the inability of Benedict and Behre to obtain in blood filtrates colours comparable with a suitable standard lies in the fact that their dinitrobenzoic acid was not sufficiently pure. In my early work I also overlooked this important point.⁽¹⁾ Not only several recrystallizations of the product are necessary, but the product has also to be prepared in such a way as to exclude higher nitrated derivatives, such as probably trinitrobenzol acid and similar compounds. Such impurities may give in the blank only a slight yellowish-brown colour reaction, but they interfere most seriously with the determination of creatinine in blood filtrates. Up to the present I have found that the method described in this paper will give with blood from human beings and animals a colour which resembles that given by creatinine, provided the creatinine concentration in the filtrate is sufficiently high. Therefore, the chromogenic substance, as detected by the dinitrobenzoic acid test, may well be creatinine, or some closely related precursor, which very readily is converted into creatinine. The method now described therefore lends further support to the recently advanced opinion that creatinine is actually present in normal blood,⁽⁴⁾ a fact which has been doubted by Benedict and Behre.⁽²⁾ However, the amount of creatinine present in normal blood, as found by the present method, is only about half to two-thirds of that found by the method of Folin.⁽⁵⁾ Some other substance or substances present in blood filtrates apparently also react with picric acid and indicate too high creatinine values by the old method. However, these unknown substances apparently do not react with dinitrobenzoic acid. This hypothesis is supported by the findings of creatinine in spinal fluid, in which apparently these substances that interfere with Jaffe's reaction are not present to the same extent. Consequently the values obtained for the creatinine content in spinal fluid as found by Folin's method and by the method described in this paper agree more closely than they do in the case of blood (Table I), and the unusually great discrepancy between the creatinine content of spinal fluid and of blood as found by the old method becomes less pronounced. Although it may not yet be possible to state definitely beyond any doubt that the colour obtained with dinitrobenzoic acid in normal blood filtrates actually represents creatinine, and creatinine only, the present method was found to be useful for the determination of creatinine in pathological blood. Moderate creatinine retention is readily discovered and measured in a 1 to 1 trichloroacetic acid filtrate. The colour obtained is easy to read and matches well. The results are still considerably lower than those obtained by Folin's method. In marked creatinine retention, however, the values obtained by the two methods agree well from a practical point of view.

In favour of the method described in this paper it is pointed out that dinitrobenzoic acid, as well as

its sodium salt, is practically colourless in contrast with the strong yellow colour of sodium picrate, the reagent used in Folin's method. On the other hand, the sensitivity of the dinitrobenzoic acid reaction is comparatively small. For normal or moderately raised creatinine values the usual 1 in 10 blood filtrates are unsatisfactory, and one has to resort to more concentrated filtrates. The usual filtrates with a dilution of 1 in 10 may still be used if one is interested only in the prognostic aspect of creatinine retention, because values of 4.0 milligrammes *per centum* or over can be measured.

Summary.

A method has been described for the colorimetric determination of creatinine with 3,5-dinitrobenzoic acid. This procedure has been applied to the estimation of creatinine in urine, spinal fluid and blood. It has been found satisfactory in urine and undiluted spinal fluid. It is, however, not applicable to ordinary blood filtrates, except in the presence of marked creatinine retention. Useful results in cases of slight or moderate hypercreatininæmia are obtained with more concentrated filtrates. The findings on blood filtrates and on spinal fluids have been interpreted as furnishing evidence in favour of the view that creatinine occurs in normal blood, although in somewhat smaller quantities than indicated by Folin's method.

Acknowledgement.

I wish to thank Miss Dorothy Dark for her valuable technical assistance. I am also indebted to the editors of *The Journal of Biological Chemistry* for their criticism.

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ON IMPROVING THE EFFICIENCY OF MECHANICALLY RECTIFIED X RAY GENERATORS.

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As portion of the activities of the Commonwealth X Ray and Radium Laboratory, the writer has, during the past year, inspected twenty-four X ray therapy equipments in various capital cities throughout Australia, and has carried out physical measurements of the output of the majority of them. Of this total, some fifteen machines are of the mechani-

cally rectified type. Although mechanically rectified high tension generators have been superseded in the makers' catalogues, largely by valve-rectified voltage-multiplying generators, it is very probable that for economic reasons many at present in use will be kept in service for a number of years. It is possible, therefore, that a note concerning methods for maintaining these plants at their most efficient operating factors may be of value.

The Voltage Wave Form of Mechanical Generators.

Mechanically rectified generators were developed so that both half-cycles of the high tension transformer voltage wave could be utilized in the production of X rays. Some form of rotating commutator switch is revolved in step with the alternations of the supply voltage by means of a synchronous motor, so that the anode of the X ray tube is connected with the terminal of the transformer that is positive for that half-cycle. The ability of the high tension current to jump a definite distance through the air makes it impossible for an actual contact to be made between the rotating arms and the collecting segment, or for the full half-cycle to be collected. In consequence, the potential applied to the X ray tube by a diagnostic type of mechanical rectifier has the wave form as shown in Figure I; it will be seen that only a portion of the normal voltage sine wave is transmitted.

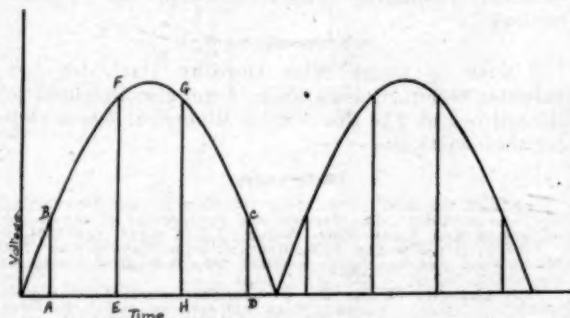


FIGURE I.
Ideal voltage wave form of mechanically rectified generator. ABCD is that portion of wave transmitted by diagnostic type equipment. EFGH is that portion of wave transmitted by therapy type equipment.

When mechanically rectified generators are to operate deep therapy tubes at voltages up to 220 kilovolts peak, it is found necessary to increase the separation between the individual sections of the rectifying switch, with the result that a much narrower portion of the voltage wave is transmitted to the tube (see Figure I), so that X rays are produced during only a portion of the half-cycle.

In practice, even the normal sine wave voltage form of the supply mains is so distorted by the resistance and autotransformer control in the primary circuit of the transformer, by capacity and inductance in the secondary circuit, and by the non-ohmic nature of the X ray tube load, that the secondary voltage wave form⁽¹⁾ may appear as shown in Figure II.

It will be seen that the potential applied to the X ray tube is determined very definitely by that portion of the voltage wave which is transmitted by the rectifier, and that for maximum efficiency the position of the rotating switch should be adjusted so that the current is passed during the peak of the voltage wave.

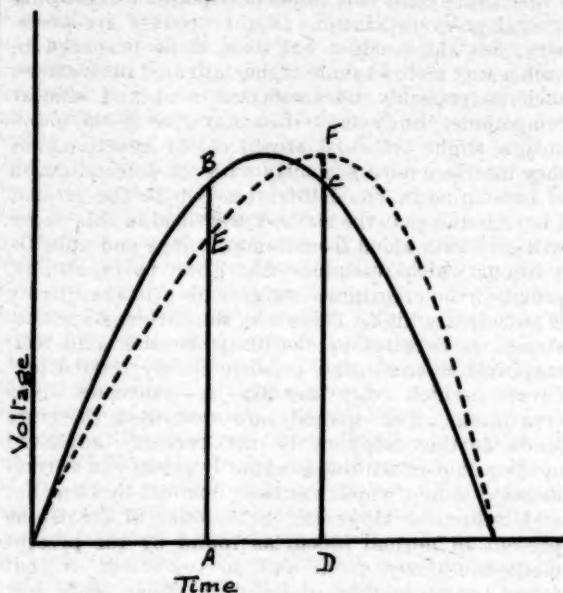


FIGURE II.
Ideal and distorted voltage waves of therapy type equipment. ABCD is portion of wave transmitted by rectifier in perfect adjustment, AEFD that due to distorted wave and imperfectly adjusted rectifier. It will be seen that although both waves have the same peak voltage, the imperfectly adjusted rectifier gives a wave of appreciably lower average voltage and therefore gives rise to a softer and less intense beam of X rays.

The degree of distortion of the voltage wave depends both upon the current and voltage in the secondary circuit. Taylor⁽²⁾ has shown that the relative efficiency of two mechanically rectified generators may vary considerably with variation of the output potential. He has also shown that differences in the length and distribution of the high tension aerial system may produce as much as 13% variation in the X ray output. The positions of the rectifying arms are usually fixed by the maker during production, irrespective of the potential and current which will be used by the purchaser, and of the capacity of his high tension aerial system. For these reasons it is really only fortuitous if any mechanically rectified generator is operating at its maximum efficiency.

In a number of cases it has been found that mechanically rectified generators are operating inefficiently. For instance, the X ray output of one generator, operating at 200 kilovolts peak, as measured with a sphere gap, is shown for different tube currents in Table I. In the third column is shown the X ray output per milliamperè-minute, and it is obvious that this generator is operating at its maximum efficiency at this voltage for tube currents of about 10 milliamperès, and that a decrease

of 22% in the output per milliamperè takes place if the equipment is operated at 20 milliamperès.

TABLE I.

X Ray Outputs from Mechanical Rectifier Operating at Constant Peak Potential and Varying Tube Currents.

Milliamperès.	Röntgen per Minute.	Röntgen per Milliamperè-Minute.
5	4.0	0.80
10	8.8	0.88
15	11.2	0.75
20	13.6	0.68

This table also indicates the lack of reliability in specifying X ray dosages in terms of milliamperè-minutes.

For valve-rectified generators, working within the capacity of their transformers, the X ray output per milliamperè-minute should not vary with the current. This is shown by the typical figures given in Table II.

TABLE II.

X Ray Outputs from Valve Rectifier Operating at Constant Peak Potential and Varying Tube Currents.

Milliamperès.	Röntgen per Minute.	Röntgen per Milliamperè-Minute.
1	4.3	4.3
2	8.7	4.35
3	12.9	4.30
4	17.2	4.30
5	21.3	4.26
6	25.8	4.31

Methods for Obtaining Optimum Position of Rectifier.

Any mechanical rectifier for which measurements of the X ray dosage rate per milliamperè for constant peak voltage show a decrease as the normally used tube current is approached, should be investigated with a view to improving its efficiency. Even if the measurements show an increase up to the normally used current (which usually is the maximum current the tube will carry), there is still a possibility that the efficiency is not a maximum.

A method of fixing the position of the rotating arms which is sometimes suggested is to short circuit the X ray tube and with a low input voltage adjust the arms until the milliammeter shows a maximum reading. This method is of value for adjusting diagnostic generators for which the collecting segment includes nearly all the half-cycle, and for which the main requisite is a high current. It is obvious that the use of this method for deep therapy generators ignores the factors which actually produce the voltage wave distortion.

The only satisfactory method of verifying that the rectifying switch is fixed in the position of maximum efficiency is to carry out measurements of the output voltage or dosage for a number of definite positions of the switch relative to the shaft of the synchronous motor, care being taken to insure that for each position the normally used peak voltage and current are applied. If an electrostatic type of kilovoltmeter is available, it will be found that the position of maximum efficiency corresponding to that giving the maximum value of the root mean

square kilovoltage can be found in an hour or so. The maximum root mean square voltage for generators operating at 200 kilovolts peak will usually range from 140 to 150 kilovolts.

If a kilovoltmeter is not available, the position of maximum efficiency can be found by measuring the dosage rates for various settings of the rectifying switch. In this case care must be taken to obtain a sufficient number of readings of the dosage rate at each setting so that an accurate mean value will result. Once the best position of the switch is determined, it is advisable to lock the switch to the motor shaft with a taper pin.

The adjustment of the rectifier should preferably be carried out with the assistance of an officer of the local physical service to hospitals, which is being established in conjunction with the physics departments of the various universities and with this laboratory.

The following experiences of the writer in carrying out adjustments of rectifiers indicate the increase in efficiency which may be obtained. In one case rotation of the rectifying arms on the shaft through 6° led to an increase in the X ray output of 15%. In another case it was found that a rotation of about 5° was necessary to move from the position of maximum efficiency for 200 kilovolts peak and 4 milliamperès to that for 200 kilovolts peak and 5 milliamperès. Any increase in the efficiency of X ray production means an equal increase in the number of treatments that can be given in the same time and with the same overhead charges, both of which have become important items in hospital therapy departments and in private practice.

The Use of Composite Filters.

When treatments are being given with filtrations of 2.0 millimetres or more of copper, the use of a composite filter of the Thoraeus type can materially increase the X ray output per milliamperè-minute without affecting the X ray quality or the percentage depth dose. Typical instances of the improvement resulting from this type of filter, and the theoretical reasons for this, have been discussed previously.⁽³⁾ Recently, composite filters have been adopted by a number of therapists in Australia. As a result of investigating the setting of maximum efficiency and of the adoption of Thoraeus filters, the output of one mechanical rectifier has been increased by more than 20%, which indicates that a physical investigation of all such high tension generators is worth while.

The measurements upon which this paper has been based were carried out as part of the activities of the Commonwealth X Ray and Radium Laboratory, University of Melbourne, as portion of the general campaign against cancer which is being conducted by the Commonwealth Department of Health, and as a part of the policy of that department in providing this laboratory for the investigation of the problems of radiation and the accurate and effective employment of radiation in the treatment of disease.

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Reviews.

DIET AND NUTRITION.

THE world is in the throes of a new idea. On the one hand we have enormous potentialities for increased production of nutritious foods resulting from the application of scientific methods to agriculture; on the other, we have the vast needs of mankind for a better diet.

The main purpose of "Vitamins and other Dietary Essentials",¹ by W. R. Akroyd, M.D., is to interest the reader in a new subject which is growing rapidly in importance every day and which is in fact in process of producing remarkable and revolutionary changes in our fundamental ideas about medicine and public health. The book drives home the fact that the majority of mankind lives on a diet which modern research has shown to be defective. "This fact", says Dr. Akroyd, "should become part of our intellectual consciousness."

Widespread knowledge of the principles of dietetics, and particularly of the ills to which malnutrition gives rise, is very desirable today. At last the existence and extent of the world-wide problem of malnutrition is being generally realized and understood.

A greater consumption of the more valuable foodstuffs, such as milk, eggs, fruit and vegetables, would stimulate agriculture, and by raising the purchasing power of the agriculturist and agricultural countries, would restore world prosperity.

There is a message for Australia in the statement that "the more a population relies on a single cereal for food, the greater becomes the importance of the degree of milling to which the staple cereal is subjected". The Commonwealth Year Book figures indicate that the *per capita* daily consumption of white flour in Australia is over half a pound. This amount, coupled with a daily intake of over four ounces per day of refined sugar, leaves very little room for the five foundation foods—milk, meat, the dairy products, fruit and vegetables—on which modern nutritional emphasis is laid.

In the chapter on diet and teeth, the new outlook on the pathology of dental decay is emphasized. The old-established conception of oral hygiene, with its emphasis on the tooth-brush and dental antiseptics, is being abandoned, and it is now being replaced by the importance of the correct feeding of the pregnant and nursing woman, of the growing infant and child, and indeed of people of all ages. The great value of Mrs. Mellanby's work lies in the publicity she has given to the relationship of nutrition to dental decay. If there is one thing that we would criticize in Dr. Akroyd's book it is the unwarranted stress that is placed on the relationship of vitamin D to dental decay; and those interested in nutrition problems in Queensland and other parts of Australia will cross swords with him in his statement on page 126 that "people who spend most of their lives in the open air will get plenty of vitamin D via the skin, and their teeth will be well calcified, and are therefore unlikely to decay". The incidence of dental decay in Queensland is as high, or possibly even higher, than the average for all civilized countries, and Mr. Hanke, the chief dental inspector of

the Queensland State schools, describes the dental situation in Queensland as "appalling".

Dr. Akroyd quotes from an interesting comment in *The Journal of the American Medical Association*: "The dietary rule of a quart of milk each day for every child is much more than a precept based on individual opinion, or drawn by analogy from feeding experiments on lower animals. It now rests on scientific evidence obtained by extensive and intensive experiments directly upon the children themselves." Statistics collected by the International Labour Office from twelve countries show that the *per capita* consumption of milk in Australia is the lowest. The figure for Australia is 80 litres *per capita* per year. This should be compared with a figure in the neighbourhood of 250 litres per year in Sweden and Denmark, Norway and Canada. There are good grounds for placing at the head of the nutritional problems of Australia the serious calcium deficiency which of necessity exists.

The Queensland sugar industry will be interested in the statement that "while the diet of modern civilized man is a great improvement on that of his ancestors, his habit of consuming great quantities of concentrated sugar, deficient in nearly all the most valuable food factors, is an item on the debit side".

Germane to the problem of the Australian aboriginal and his decadence in the nutritional environment which the white man affords, is the comment that "we are realizing slowly the danger of giving subject races access to the cheaper foods of Western civilization. In the past our chief excuse was that we sinned in ignorance, but today that excuse is no longer valid".

Dr. Akroyd comes to us with the imprimatur of the League of Nations. He was the joint author of that remarkable League of Nations publication "Nutrition and Public Health". This book was endorsed by the League of Nations Commission on the Physiological Bases of Nutrition.

The inherent difficulty from which any text book on the subject of nutrition suffers at this present juncture is that the science is undergoing such rapid changes that any considerable work will be almost out of date before the proofs are ready for correction. If one were asked for a turning point on which to base the more modern outlook, one would think of the first report of the League of Nations Commission on the Physiological Bases of Nutrition, published at Geneva last December. With this proviso, Dr. Akroyd's book, although published originally in 1932 and revised in 1935, represents a valuable contribution to the modern outlook and will provide the medical reader with a suitable background on which to base the more recent advances which are at present available only in the form of pamphlets, reports and articles.

MINOR SURGERY AND FRACTURES.

AN old friend of the student and young practitioner has been revised and issued under a slightly altered name. Heath's "Minor Surgery and Bandaging" now appears as "Minor Surgery and the Treatment of Fractures", by Gwynne Williams.¹ It is one of the most readable of all such handbooks and is full of useful information for the inexperienced. There are but few minor surgical procedures to which adequate reference is not made, and the section on post-operative treatment is well up to date and most valuable. The chapter on anaesthetics has been completely rewritten by H. N. Webber and, though necessarily brief, it embraces most of the recent advances in that specialty. In the section on fractures plaster of Paris has been dealt with *in extenso*, a welcome substitution for descriptions and illustrations of the old-fashioned splints, which, though interesting from an historical viewpoint, are seldom employed now—rather do we fit the splint to the patient than the patient to the splint. The book is recommended to senior students and young practitioners.

¹ "Vitamins and other Dietary Essentials", by W. R. Akroyd, M.D.; Second Edition; 1936. London: William Heinemann (Medical Books) Limited. Demy 8vo, pp. 238. Price: 7s. 6d. net.

¹ "Minor Surgery and the Treatment of Fractures (Heath, Pollard, Davies), for the Use of House Surgeons, Dressers, and Junior Practitioners"; Twenty-First Edition; by G. Williams, M.S., F.R.C.S.; 1936. London: J. and A. Churchill. Crown 8vo, pp. 493, with illustrations. Price: 10s. 6d. net.

The Medical Journal of Australia

SATURDAY, DECEMBER 12, 1936.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

MEDICINE AND THE STRAIN OF MODERN CIVILIZATION.

Few people who think of more than the needs of the moment can have failed to ask themselves where this topsy-turvy world is heading, why whole nations are being forced to submit to this or that despotic form of government, and whether indeed so-called modern civilization is worth while. They must also surely have asked themselves what they can do about it and whether an attempt to do anything is worth while. It is appropriate therefore to draw attention to an address given by the Right Honourable Lord Horder before the Section of Physiology of the British Association for the Advancement of Science at its meeting at Blackpool, England, on September 15, 1936.¹ Lord Horder chose as his subject "The Strain of Modern Civilization", and *The Times* states that an exceptionally large audience assembled to hear him; this is not surprising, for we have become accustomed to hear from him words that are weighty, well chosen and stimulating.

Lord Horder began his address by saying that strain was the penalty that man had to pay for

living at all. Philosophers, he added, have always assured us that we cannot have life without it, that some degree of strain is good for us. But the stress of modern life has new elements and is excessive. Every medical practitioner will agree that functional as opposed to organic diseases have increased, and that in case after case "a tactfully conducted pursuit after fundamental causes removes the screen of headache, insomnia, indigestion and fatigue, and the anxiety factor is revealed". Though many fulminant infectious diseases have been controlled, there is an increase in the more subtle diseases called "sub-infections", in which "the virulence of the microbe is low, whilst the susceptibility of the host is high". In many of these conditions the germ comes from within and not from without. The only reason that Lord Horder can assign is "a 'give' which seems to follow a lowering of the control exercised in health by the nervous system". He enumerates the causes of nerve strain in what he declares are almost platitudes. Among them are the anxiety associated with the competition of living and with the "equally grave and increasing sense of international insecurity"; the pace at which we live; the precariousness of life in the streets, "so that we seem . . . to live by accident rather than to die by it"; the monotony and the drabness of the work of many people; lack of air, of exercise and of sleep; the excitement of many of our amusements; and noise—"needless, stupid, provocative, ill-mannered, selfish noise". The notion that science is responsible for the extent and persistence of much of the strain of modern life is to Lord Horder mere pusillanimity, for he holds the view that it is not too much but too little science that has helped to get us into this trouble—not enough interest has been taken in and not enough direction has been given to science. "We need not drive a car so fast that it kills, or make a loud-speaker so loud that it deafens. Science was made for man, not man for science, and the one thing that matters is control." Who cares, Lord Horder asks, about the direction along which science produces her gifts to mankind? We have, he points out, an astronomer royal, but we have no biologist royal, still less a psychologist royal. Hygiene of

¹ *Nature*, September 26, 1936.

the body has been grasped, and mental hygiene is in the process of being born. "What of spiritual hygiene, the hygiene of temperament?" The spirit of man is, he thinks, fundamentally as amenable to scientific investigation, if not to control, as is his body and his mind.

What of the remedy? Lord Horder's prescription will be obvious. In the forefront he places more science, and science directed towards the study and development of the mind and the spirit of man. We should cherish the amenities that we have and support those that are struggling for recognition: leisure for all who "grunt and sweat under a weary life", slum clearance, playing fields, national parks, physical training, adult classes, pictures, poetry, music, museums, libraries, architecture, quiet for the brain worker and others. To those who would contend that instead of dealing with the individual we should prescribe for the masses, Lord Horder replies that he can see little hope for the people of Great Britain through mass movements. "Fascist or Communist, when individual freedom has been sacrificed, I see no chance of achieving that control in the spiritual sphere through which alone, I believe, salvation can come to the human race. What matters the colour of men's shirts if these are soon to be their shrouds." Here we may point out that Sir Arthur Newsholme, in a recently published book, has described the relative economic and political success of contemporary Russia as partaking "more of the nature of an animal triumph in a Titanic struggle than of a spiritual development". The same view must be held of Fascism and its exploits. Sir Arthur Newsholme has little faith in the permanency, or at any rate in the permanent value, of otherwise desirable reforms achieved by coercion and the suppression of honest criticism and honest opposition—a view that is perhaps not out of place in a discussion on the strain of modern civilization. Lord Horder draws an analogy from medicine which is all against treating the crowd and in favour of treating the individual. Britishers, in his opinion, and possibly most men, to be treated successfully must be treated through their intelligence and through their will, and not through their emotions. "The change must come from within

and not from without." This takes time, but, given time and freedom from what Lord Horder calls the arch-enemy fear, we can reduce the strains of modern life "by effecting a better adjustment in ourselves to the rapidly changing conditions of our times, reducing the pace at which we live, and achieving control". How does this discussion particularly affect medical practitioners? We have often emphasized the rôle of the medical profession as the leaven that may leaven the whole lump of society in more than one respect. Lord Horder points out that in the present instance the treatment is the treatment of the individual by the individual; and he adds that any physician who can inspire gentleness, virtue, wisdom and endurance will help to hasten and establish the cure. He concludes that any physician who cannot prescribe these remedies obstructs the cure and should stand aside.

Current Comment.

DIABETIC COMA.

SINCE the days of Pierre Louis the value of large hospitals has been enormously increased, not only by medical discoveries, but by the adoption and appreciation of the statistical method. The application of arithmetical symbols to masses of clinical material has enabled us to develop surer powers of diagnosis, to foretell events with what would once have been thought uncanny accuracy, and to evaluate the worth of specific treatment. The improved handling today of many systemic diseases rests entirely upon the validity of these facts, and in no disease do they fulfil a more important function than in diabetes.

At the Mayo Foundation, T. W. Baker¹ has published his investigations into 108 cases of diabetic coma occurring in 99 patients from October, 1923, until January, 1934. Amongst these patients there was a total mortality of 15.7%; three died from uncomplicated coma, nine from other complications after recovery from coma, and five died of complications before regaining consciousness. Perhaps because of the carelessness in diet that is often the feature of a holiday, coma appears to be more prevalent in America during the summer months. Females, and particularly elderly females, are more frequent sufferers than men, for in them diabetes is generally more severe in type than in men of the same age group. The average age of Baker's

¹ *Archives of Internal Medicine*, September, 1936.

patients was 31.2 years. The oldest was a man of seventy-four, the youngest a child of three. Twenty-six of the group were children under fifteen years of age, for the incidence of coma reaches the peak during the second decade. In the average case three months passed before the diagnosis of diabetes was made, and a further twenty-three and a half months before the appearance of signs of coma. No less than 53.7% of the cases of coma were known to have followed dietetic indiscretions or the neglect to take insulin. Infections were the determining cause of the coma in thirty-two instances, and of these infections more than one-half involved some part of the respiratory tract; the remaining infections made a huge list—cellulitis, erysipelas, appendicitis, acute rheumatism, to mention a few among many. Coma occurred five times after surgical operations, twice after so simple a proceeding as tooth extraction. These happenings, however, do not weaken the case for necessary operations, even in states of severe acidosis; nine of Baker's patients underwent major and nine of them minor operations after recovery from coma. Hyperthyroidism, a not uncommon companion and forerunner of diabetes, was a complicating disease in six patients.

Of all the signs of diabetic coma, Baker thinks Kussmaul breathing the most important. It occurred in 82.5% of his series. In so large a group of patients the states of coma were naturally of all degrees. There were thirty-two instances of total unconsciousness, a like number in which the picture was one of wooden stupor, and forty-one cases of mere drowsiness or lethargy. Seven patients died in whom coma had been evident for more than twelve hours before admission to hospital. Very surprisingly, there seemed to be little or no constant relation between the degree of coma in any given patient and the degree of chemical change in that patient's blood. The presence of infection and the patient's age would appear to be more important factors in the production of coma than abnormal amounts of blood sugar or grave diminution of the alkali reserve. The people of the age group twelve to forty-five years seemed to tolerate a lessening in the carbon dioxide combining powers of the blood far better than the very old or very young, in both of which classes the threshold of unconsciousness was lowered.

Diagnostically, the diabetic with acidosis may present a problem of immense difficulty. The vomiting and the abdominal pain and tenderness may suggest a disease requiring urgent surgical intervention; and the difficulties are greater in the knowledge that some of these latter conditions themselves produce intense acidosis. In brief, acidosis may simulate acute "surgical" disease in the abdomen, may precipitate it or may result from it. In either condition leucocytosis is present. In Baker's series an increase of white cells to twelve thousand or more per cubic millimetre was found in 38 of 69 blood examinations, and in the great majority of cases acute abdominal disease could be excluded from the diagnosis. Of twenty-five patients

with signs and symptoms suggesting the necessity for abdominal section, a mere three required operation in the long run. Evidently, when error arises, it is more likely than not to lead to uncalled-for surgery. The cause of these perplexing signs and symptoms in cases of diabetic coma is a dark mystery. To a small extent they may be explained by the presence of gastric distension no doubt; but we are as yet unaware what part in their production is played by lesions of the pancreas.

Amongst the cases of coma here reviewed, a notable feature was the absence of large amounts of blood sugar. The figures ranged from 140 to 840 milligrammes per 100 cubic centimetres of blood, and the average reading was 371 milligrammes. Patients in the same clinical condition may show an astonishing variability in the figures. One man may be comatose with a blood sugar reading of 300 milligrammes, and another with one of 600 milligrammes merely drowsy. A likely explanation of these phenomena is again that the factors of age and coexisting infection have an important bearing on the presence of coma; and it would not seem that a high blood sugar value is of itself necessarily prejudicial to a favourable ending of the coma. Blood sugar findings are therefore not reliable measures in the prognosis of individual cases. Laboratory "recoveries" are not infrequent while the patient's condition becomes graver. Treatment is successful, but the patient dies.

Loss of consciousness usually occurs when the carbon dioxide combining power of the blood plasma falls below the level of 12 volumes *per centum*; but here again figures and clinical findings do not run parallel. Five of Baker's patients, giving a lower value than this, were drowsy or mildly stuporous; three with a reading of 28 volumes *per centum* were deeply comatose. It is observed that whether the carbon dioxide combining power of the plasma be less or more than 15 volumes *per centum*, no difference is to be found in the mortality rate. Nor is the quantitative examination of the urine for sugar invariably a trustworthy measure of the severity of a case of diabetic coma. The presence of sugar in the urine is not an invariable sign of diabetes, and the condition of acidosis may be present without acetonuria. Such instances are rare, but Baker reports three of the kind, and these without tokens of coexistent renal changes. It sometimes happens that the amount of undetermined organic acid excreted in the urine much exceeds the amount of ketone bodies. This acid is now known to be lactic acid, and is considered to be the active cause of the coma. In such cases insulin is frequently ineffective, and in these the giving of alkalis is recommended.

Clinical workers will agree with Baker's opinion that in all cases of diabetic coma time should not be lost in waiting for the results of laboratory tests. Treatment with insulin should be governed by the age of the patient, the depth of his coma, and the presence or otherwise of infection. Laboratory data are essential to prevent hypoglycæmia.

Abstracts from Current Medical Literature.

SURGERY.

Choledocholithiasis.

WALTMAN WALTERS (*Surgery, Gynecology and Obstetrics*, October, 1936) discusses the problem of stone in the common bile duct, referring particularly to that group of cases in which the characteristic symptomatology associated with stones of the common duct is lacking in some details or even in its entirety, or in which the presence of the stones is an unexpected finding at the time of operation on the gall-bladder. It is believed that many of the so-called cases of unsuccessful cholecystectomy are attributable to the presence of stones of the common duct which have been overlooked. The author also refers to the fact that on innumerable occasions he has removed diseased gall-bladders containing stones from patients who presented rather typical clinical histories of disease of the biliary tract, but to whom someone previously had denied operation because the gall-bladder had filled and emptied normally and shadows of a stone or stones had failed to show in the cholecystogram. Summarizing his experience of this work at the Mayo Clinic, the author states that one or more stones may be present in the common bile duct without producing jaundice. Such stones may produce biliary colic or intermittent fever, or both; and either or both may be associated with pylorospasm. The increased diameter of the common bile duct is a sign of its obstruction, and the obstruction may be attributable to stones or to a pancreatic or other obstruction. In many cases continuance of symptoms of disease of the biliary tract subsequent to cholecystectomy can be attributed to the presence of forgotten stones of the common duct or to persistent inflammation of the pancreas or sphincter of Oddi, any of which may obstruct the passage of bile into the duodenum. Factors concerned in the production of stones of the common duct are their expulsion from the gall-bladder and the formation of soft bile pigment stones secondary to persistent obstruction of the common duct in conditions such as pancreatitis and sphincteritis. Studies of the bacterial flora of bile removed from the common tract disclose in most cases the presence of bacilli of the Gram-negative or colon group, or streptococci or staphylococci. All of these are present in some cases. Bacterial studies of bile and analysis of removed gall-stones are as necessary as similar studies of the urine and urinary calculi, for, since urinary infections have been demonstrated to respond to increasing acidification of the urine and to the use of certain substances, such as the arsenical preparations used in the treatment of

syphilis, similar response to biliary infections might result, especially if antiseptic radicles were attached to the halogenated phthaleins which are excreted through the liver into the bile. Studies of intraductal pressure and intraductal conformation, by the use of opaque substances injected into the duct through a T-tube, have been of value in determining the persistence of pancreatitis or sphincteritis interfering with proper emptying of the common duct and hence have assisted in determining the length of time necessary for continuance of drainage of the duct by the T-tube.

Ununited Fractures.

M. S. HENDERSON (*The Journal of the American Medical Association*, October 3, 1936) makes further reference to the massive onlay autogenous graft and records the fact that of 374 patients treated at the Mayo Clinic by this method, bony union resulted in nearly 85%. In support of this method he points out that, because considerable absorption takes place before any bone graft is vascularized and revitalized, a period of weakness occurs, and therefore the larger the graft, the greater its strength during this period. Experience has shown that the larger the graft, the greater the chance for success. However, it is still necessary to use adequate external fixation until union has become complete. As an additional step in the operation the site of fracture is packed with scrapings of spongy bone obtained from near the epiphyseal lines, and this is said to be important. This series includes a moderately high percentage of cases in which earlier but unsuccessful attempts had been made to obtain union by other methods. Syphilis was not a factor in this series.

Portal Thrombosis Following Splenectomy for Splenic Anæmia.

S. W. MOORE (*Surgery, Gynecology and Obstetrics*, September, 1936) reports two cases of portal thrombosis following splenectomy. For many years some relationship has been thought to exist between portal thrombosis and Banti's disease. Whartin considered splenic and portal obstruction a cause of splenic anæmia. In the type of splenic anæmia associated with thrombocytopenia, splenectomy gives excellent results. In the type of splenic anæmia associated with an excess of blood platelets the results of splenectomy are not satisfactory. Splenectomy in this latter group may even prove dangerous. The author's first patient had suffered from an enlarged spleen for ten years. During this time hæmatemesis had been frequent, necessitating blood transfusions. A very large spleen was removed at operation. A pulmonary infarct occurred a few days after operation. The blood platelets were 480,000 per cubic millimetre before operation and rose to

650,000 on the twelfth day. By the forty-second day they had fallen to 310,000. Autopsy revealed thrombosis of the portal, splenic, mesenteric, coronary and left renal veins, as well as some branches of the left pulmonary artery. There was also present a cirrhosis of the liver. The author's second patient also showed an excess of blood platelets before operation. Operation was delayed for fear of thrombosis on that account. X rays were directed to the spleen and long bones in the hope of reducing the platelet count. After eleven radiations the platelet count had fallen from 500,000 to 120,000. The patient had bilateral polycystic kidneys. At operation in October, 1932, a large spleen was removed. The patient died approximately three weeks after operation, and at autopsy the portal, splenic and mesenteric veins were found to be thrombosed, and a loop of jejunum showed early gangrene. The author concludes that operation should not be undertaken in cases of splenic anæmia showing a high platelet count.

Orbital Surgery.

G. E. CLAY AND J. M. BAIRD (*The Journal of the American Medical Association*, October 3, 1936) describe the use of grafts from the prepuce or *labia minora* to repair conjunctival defects and to restore the socket. It is pointed out that there is plenty of tissue available for such grafts, and that it has all the appearance of a perfectly normal conjunctiva a very short time after it has been grafted. Such grafts are very thin and contain no hairs and very little subcutaneous fat. The authors describe the technique adopted and also describe their procedure for restoration of the socket.

Hyperthyroidism in Children.

JAMES A. LEHMAN (*Western Journal of Surgery, Obstetrics and Gynecology*, September, 1936) records several cases of hyperthyroidism in children, and discusses the condition. He points out that it is not a condition that tends to self-limitation; rather is it a progressive disease with high mortality if overlooked. The etiology is uncertain; the symptoms are the same as in adults, but the basal metabolic rate may be misleading. Thyroidectomy gives the best results.

Appendicitis in the Small Hospital.

ROYAL F. SENGSTACKE (*Surgery, Gynecology and Obstetrics*, October, 1936) states that appendicitis is the commonest acute surgical condition. In the United States of America more than 600,000 persons are affected each year, and the average number of deaths is more than 18,000. The literature contains few references to the results obtained in hospitals having fewer than fifty beds. During the past fifteen years the author has dealt with 602 cases of acute and purulent appen-

dicitis in a small country hospital. The sexes were approximately equally affected. The mortality among males is nearly twice that of females. Patients operated on within the first twenty-four hours have the best chance of recovery, whilst those operated on on the third day show the highest mortality. Children under ten years and adults over sixty years are "poor risks". A total leucocyte count exceeding 20,000 per cubic millimetre usually means perforation. Vomiting and tenderness are the most important findings. The author invariably employs a right lower rectus incision. He seldom inverts the stump. No difference follows the application of carbolic acid and alcohol or tincture of iodine to the stump. In the author's opinion, drainage can be dispensed with in all doubtful cases. Ileostomy is a fickle friend, but should be remembered when ileus is not relieved by "Pitressin", hypertonic saline solution or the duodenal tube. "Too much knowledge may lead to a mistaken or delayed diagnosis." Ether is the most satisfactory anaesthetic. Patients in a small hospital frequently receive better post-operative care than can be given by medical officers in large teaching institutions.

The Treatment of Fractures of the Os Calcis by Pin Traction.

W. RUSSELL MACAUSLAND (*Surgery, Gynecology and Obstetrics*, October, 1936) reports a study and results of treatment of fractures of the *os calcis* by pin traction. It is based on a study of seventeen cases so treated. Sixteen patients were males with an average age of forty-five years. Pin traction was instituted within four days following accident. All patients but one have obtained good results. Movement at the ankle joint was normal. Inversion and eversion were diminished, but the restriction constituted no handicap to the occupations of the patients. Approximately half of the patients complain of tiredness in the foot after a day's work. After a few years some patients show X ray evidence suggesting arthrodiesis at the subastragalar joint. The author attributes arthrodiesis to the type of fracture rather than to the method of treatment. Only one patient in the series had a poor result. Arthritis in the surrounding joints followed an infection of the region of the pin. The author contrasts his recent results with those obtained by manipulation and plaster of Paris casts. Prior to 1930, in a given group of twelve cases, seven results were poor and showed either flat-foot deformity or painful arthritis in the vicinity. In another group of 61 patients who received practically no treatment, there was not a single patient who did not complain of pain, swelling and restricted lateral motion of the foot. Of the 61 patients comprising the group, not one had returned to his former occupation. Care is necessary in breaking up the impaction to secure

free motion of surrounding joints, as this is necessary before inserting a pin. It is essential to protect the foot by some form of apparatus for at least six months after removal of the plaster of Paris cast.

Paraffin Dressing for Transplanted Grafts.

D. V. TRUEBLOOD (*Western Journal of Surgery, Obstetrics and Gynecology*, October, 1936) describes the use of paraffin in the after-dressing of transplanted grafts. After discussing the requisites of a suitable dressing, he describes the method of applying the paraffin through an atomizer, and gives the reasons for having selected it as the ideal dressing. The crust thus formed gives perfect protection against movement, and it is easy to remove subsequently. This dressing is also used to cover the denuded areas from which the grafts were taken, and is applicable to both pinch and Thiersch grafts.

Pole Ligation in Hyperthyroidism.

F. H. LAHEY AND L. J. SCHWALM (*Surgery, Gynecology and Obstetrics*, July, 1936) record their opinions on the question of pole ligation in the treatment of the more severe grades of hyperthyroidism. These opinions are drawn from their experiences of 14,000 thyroid operations. Of this large number of patients, only 85 died. Of this series, 119 had preliminary pole ligation performed. The authors find difficulty in making a hard and fast rule to distinguish cases suitable for such procedures, and place most reliance on two factors, namely, a persistently high pulse rate—160 or more—and a failure to gain weight in spite of rest, a high carbohydrate diet and Eugol's solution. They discuss the multiple stage operation at length and give an account of the operative procedure for ligation of the superior thyroid artery and a *résumé* of some of their results, but are unable to advance any definite explanation for the improvement usually noted.

Intestinal Obstruction.

JUSTUS KAUFMAN (*The American Journal of Surgery*, October, 1936) discusses the diagnosis and biochemistry of intestinal obstruction and their relationship to therapy. A workable classification is the following: acute mechanical, acute non-mechanical and chronic obstructions. Acute mechanical obstruction is often due to post-inflammatory or post-operative adhesions or to strangulations of external herniations. In children under two years of age more than 75% of obstructions are due to intussusception. Neoplasms as a cause come fourth in the order of frequency. The non-mechanical group may be divided into adynamic and spastic. The former produces the silent abdomen of peritonitis. The functional type would also include the ileus associated with spinal cord disease or uræmia.

The plastic type may follow a blow, lead poisoning or disease of the mesenteric vessels. The classical signs and symptoms of intestinal obstruction are essentially four: (i) colicky pain, (ii) regurgitant vomiting, (iii) progressive distension, (iv) absolute constipation. If the obstruction is high, there may be very little distension in contradistinction to obstruction existing in the large bowel. Obstruction may be complete and yet the bowel below the obstruction may be emptied spontaneously. In order to determine whether obstruction is complete, the author advocates the administration of mineral oil by mouth, 30 cubic centimetres (one ounce) every hour, and observing whether oil drops are present in the Harris drip enema can. The evidence of heart disease should be sought if embolic phenomena suggest arterial disease. Quite recently much study has been given to X ray findings in this condition. A ladder pattern of intestinal coils containing gas may show where the obstruction is, in large or small bowel. No enema should be given prior to X ray examination. Blood counts yield little information of value in determining the onset of gangrene of the intestine. Protracted vomiting invariably leads to an alkalosis, and the starvation associated with vomiting leads to ketosis, since the combination of fats is defective. Even if vomiting does not occur, blood chlorides are greatly diminished. Death from intestinal obstruction may be due to a combination of several factors—loss of body fluids with the subsequent shock syndrome, disturbances of acid base balance, or toxæmia alone may be responsible, apart altogether from perforation and peritonitis, which may be complications. Preoperative infusion of saline solution and glucose should be a routine. If the obstruction is mechanical, the operation is best performed under spinal anaesthesia. If there is pronounced shock, local infiltration and ether are better anaesthetics. After the obstruction is freed, a blood transfusion will hasten recovery. After the patient is returned to the ward, a gastric lavage may be carried out with advantage, and a rectal tube should be left *in situ*. Continuous infusion of saline and glucose is advantageous. Gas gangrene antiserum may minimize the toxic effects of intestinal stagnation. "Pitressin" given intramuscularly will promote peristalsis.

Extirpation of the Adrenals.

HUGH H. YOUNG (*Surgery, Gynecology and Obstetrics*, August, 1936) details an operative procedure for adrenalectomy, in which the patient is kept in one position on his face and the two adrenals are exposed for simultaneous examination and decision as to the operative attack. This method is claimed to be much superior to others which involve a clumsy change-over, the surgeon operating first on one side and then on the other.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held at the Medical Society Hall, East Melbourne, on September 2, 1936, Dr. WALTER SUMMONS, the President, in the chair.

Problems of General Practice.

Dr. L. E. HURLEY read a paper entitled "A Discussion of Some of the Common Problems met with in General Practice" (see page 808).

Dr. J. P. MAJOR said that Dr. Hurley had that evening presented from his own knowledge and experience much material for discussion, and Dr. Major was sure that he could thank Dr. Hurley on behalf of those present for a most instructive and interesting address. Though Dr. Hurley had referred to many different subjects, one of the most important was the great stress he had laid on the cultivation of sound clinical judgement. He had insisted on the importance of obtaining a full history and of making a thorough physical examination and of correlating carefully the information thus obtained with that from special investigations. This advice alone would make the address of great value to many of the younger members of the profession; those who participated in the teaching of medicine knew how they had to curb the tendency of some resident medical officers to rely for a diagnosis largely on special investigations instead of on the history and the thorough routine examination of the patient.

Dr. Hurley had stated, though not expressing any opinion as to their value, that "Solganal" or other gold salts were not being used as much as formerly. Dr. Major was interested in the use of gold preparations and, though well aware of the difficulty of assessing the value of such treatment, he had reason to think it was of some value in selected cases of pulmonary tuberculosis. Dr. Major said that he was in London at the time when the use of gold preparations was revived there, some eleven years earlier, by the receipt of supplies of "Sanocrysin" from Møllegaard, of Copenhagen, by the heads of the medical units of some of the London hospitals. It had been used with the most careful precautions to check the risks and the advantages attending its administration; it was found that there were attendant risks and that the results were not so good as had been hoped. Later, gold therapy had come into vogue in the United States of America. Dr. Major believed with Dr. Hurley that it had fallen into disuse, but he wondered if it might not be the abuse of it rather than the use that had caused it to fall out of favour. Dr. Major had had some little experience of "Solganal" and he used the preparation usually in a series of doses, each of 0.1 gramme; and, though his experience of tuberculous skin conditions was very limited, he had good reason for believing that it was of value in these conditions. He thought a discussion on the value of gold salts and of some other drugs would be well worth while at a future meeting.

Dr. Major said that he was in complete accord with what Dr. Hurley had said regarding anaemia, and with his remarks on the use of iron and liver combined in pills and tablets; in either form of anaemia adequate doses of the appropriate remedy were necessary, and in pernicious anaemia it was essential that an efficient preparation should be used. He referred to one patient who had benefited largely from the administration of liver extract and had then ceased treatment; when a relapse occurred she began to take a certain liver tablet and took approximately twelve tablets a day; as improvement did not follow, Dr. Major was consulted again and, desiring to know the strength of these tablets, correspondence between the patient and the manufacturers elicited the information that in order to obtain the equivalent of half a pound of fresh calf's liver the patient would have to take about one hundred and twenty-four tablets each day.

Dr. Major said that he agreed with Dr. Hurley on the great value of giving sleep to a patient who was really ill with pneumonia, especially in the later stages if the patient was fighting for his life. In such a case he believed firmly in the use of morphine in adequate dosage; if only one-sixth of a grain was given, almost invariably it had to be followed by another dose at a short interval, and the ultimate effect was not so good and there was a risk of administration of a total amount that was larger than was necessary. It was better not to play with the condition, but to give one-quarter of a grain or more in the first place to insure a few hours' sleep. Leaving aside the other advantages of sleep, this procedure relieved the patient's mental distress temporarily and thus gave him a better chance of surviving the critical period of an acute illness.

Dr. Major said that recently he had read with interest an article on the use of digitalis in pneumonia. As Dr. Hurley had referred to certain statistics on the subject and to the unreliability of statistics in general, and as digitalis had for years been used locally almost as a routine, it might be of interest to those present to know that over a series of hundreds of cases in which an equal number of patients did not receive digitalis, it appeared from the figures that the greater mortality occurred among those treated with digitalis.

Dr. F. BLOIS LAWTON joined in congratulating Dr. Hurley on the excellence of his paper; experience led them to expect something good from Dr. Hurley, and he had maintained his usual high standard. Such a wide field had been covered that discussion was difficult, and certain parts, such as the treatment of pneumonia, could occupy all the available time. Two years ago in Sydney a discussion on the treatment of pneumonia took a whole evening. Dr. Major had referred to a series of patients treated and untreated by digitalis, and Dr. Lawton wondered whether the patients had been observed under the conditions which Dr. Hurley had laid down in his paper. In a very recent series the reported results were just the opposite. In *The British Medical Journal* of June 6, 1936, there had appeared another report by Tidy, containing statistical studies of the relative value of medical and surgical treatment in gastric and duodenal ulcer. Tidy's observations led him to conclude that the results of medical and surgical treatment were approximately the same. The advantage lay with medical treatment, because the patients avoided an operation which had an appreciable risk, and they were absent from work for a shorter time. Whatever the results might be, even with a large number of cases, the statistics could not be relied on, because certain cases must be regarded as essentially surgical.

Prognosis was always difficult, and possibly it was more difficult in cardiac disease than in any other. Dr. Hurley had dealt fully and wisely with that question, and Dr. Lawton said that very considerable advances had been made in knowledge in recent years, and the work that was going on everywhere, both with machines and without them, was likely to increase that knowledge and make prognosis more accurate.

Dr. Lawton was glad to see that Dr. Hurley had included syphilis as one of the causes which should be sought particularly in cardiac disease. There seemed to be a tendency to attach less importance to syphilis as an aetiological factor than had been noted some years previously. It was necessary to include it in the consideration of every case of cardiac disease, especially in middle-aged and elderly patients, and when there was any suspicion that it might be the cause it was worth trying the effect of anti-syphilitic treatment, even when the Wassermann test gave no reaction.

The description of vaso-vagal attacks was very clear, but perhaps some further elaboration might be desirable in view of the statement by Lewis that a fall of blood pressure and a slowing of the pulse rate to 50 or 40, or even 30, was characteristic of that condition. In toxic goitre the high incidence of glycosuria stated by Joslin did not seem to apply here, for glycosuria had not been a common finding in the cases that Dr. Lawton had seen.

Dr. Hurley's views on achlorhydria were similar to those of Dr. Lawton; he also agreed that injections of iron were

unnecessary and might in some instances prove dangerous. Dr. Lawton emphasized that sufficiently large doses of iron were necessary in hypochromic anemia, and the ordinary British Pharmacopoeia preparations were satisfactory, but patients often found the taking of numerous pills a burden; this could be overcome to some extent by giving the ferrous carbonate in capsules. The hope of giving a preparation of iron which would be effective in small doses had led Dr. Lawton to try a preparation of which the manufacturers claimed that a dose of about two grains would be equivalent to fifteen grains of Bland's pill. This might have been true, but he had been unable to find a patient whose stomach would tolerate it. The large doses of potassium citrate recommended were in general use and they were necessary to produce the desired result, but they might be the cause of nausea or vomiting.

Some years previously Osman had suggested the use in scarlet fever to prevent nephritis of a mixture containing potassium citrate, potassium bicarbonate, sodium citrate and sodium bicarbonate, of each fifteen grains, and equal parts of chloroform water and peppermint water to the dose. Dr. Lawton had been using that mixture with satisfaction in cases of pyelitis.

Good results could be obtained by treatment with alkali and without a course of hexamine or other urinary antiseptic afterwards. The most important part of the treatment was to maintain the alkalinity of the urine during the night, and unless the first specimen passed in the morning was alkaline the treatment was unsatisfactory. Pyelitis was one of the few conditions in which it was justifiable to disturb sleep in order to give medicine. In Osman's article on the treatment of pyelitis in the special series in *The British Medical Journal*, he did not advise his original mixture, but, instead, thirty grains each of sodium bicarbonate and potassium citrate. It was obvious that if there was a failure to improve either with the alkaline or any other form of treatment, investigations should be carried out in order to try to discover why the treatment had failed.

There were two things of interest in connexion with spontaneous subarachnoid hemorrhage to which Dr. Lawton referred. The first was the occurrence of glycosuria in some cases; this was of some importance, as it might lead to a wrong diagnosis. Dr. Lawton said that one patient had been admitted with this condition to his ward some years earlier with a diagnosis of diabetic coma. Although sugar might have been present in considerable quantity, acetone and diacetic acid were absent. The second thing of interest was the recent advance in treatment by ligation of the internal carotid artery. Before doing this it was necessary to confirm the diagnosis and to find the site of the aneurysm by injecting "Thorotrast" and very quickly taking radiographic films. Dr. Lendon had recorded successful treatment by this method, and both he and Dr. Graeme Robertson had demonstrated skiagrams showing aneurysms. Dr. Lawton thought that this method of treatment offered possibilities in younger patients, but that in older patients with sclerosed arteries it was likely to prove disastrous.

Dr. Lawton referred to the use of "Salyrgan" in conditions in which it was supposed to be contraindicated. "Novasurol" was much more toxic and had been known to cause severe colitis and at times death, but "Salyrgan", if used with care and in small doses, had been found to be of great value. He had experienced difficulty in noting the return of oedema by means of weight control because so many of the patients were of necessity confined to bed.

Dr. G. A. PENINGTON expressed his very great appreciation of Dr. Hurley's paper and made special reference to the excellence of his descriptions of such cardiac problems as the vaso-vagal and thyrotoxic conditions which were reminiscent of the utterances of Sir William Osler. In commenting on several points Dr. Penington referred to the patient with the positive Casoni reaction who had been mentioned by Dr. Hurley. This man had previously had a hydatid cyst removed from the thigh muscles. He was entirely intolerant of antiseptic treatment in any shape or form; even iodides caused pain, but he had lived for five years without any effective treatment. With reference

to cardiac conditions, when tachycardia was present and the pulse rate was 120 or more beats per minute, extrasystoles, if present, were an indication of cardiac damage; and, when the patient showed symptoms of inefficiency, they caused more anxiety than was caused by a similar patient with tachycardia but regular rhythm. Myocardial efficiency was the important feature in disturbances of rhythm. He recalled a patient suffering from paroxysmal tachycardia who became very distressed, but Dr. Penington had always been able to control the tachycardia readily by pressure on the carotid sinus. This man was eighty-four years of age, with complicating emphysema and diabetes, and, after having such attacks over a period of seventy years, had presumably committed suicide. If the cause of the condition was not proved otherwise, thyrotoxicosis must be suspected in patients with paroxysmal or persistent auricular fibrillation. In patients with vaso-vagal attacks Kinnear Wilson had noted not only the passage of lots of urine, but that there might be incontinence of faeces.

In commenting on treatment, Dr. Penington referred to the gold preparations and adopted a position similar to that of Dr. Lawton. He pointed out the necessity of viewing the natural history of any disease in assessing the value of treatment, and of realizing that certain changes which followed treatment might be likely to occur in any case. Histidine was fashionable at present in the treatment of peptic ulcer, but Dr. Penington predicted that it would fall into the same category as many other preparations; better results might be obtained with saline solution or with various other parenteral preparations—with milk or peptone for example; histidine amused the patient while Nature effected the cure. The attacks ended spontaneously or seemed to disappear when the patient went on holiday. He recalled an instance previously recorded in *THE MEDICAL JOURNAL OF AUSTRALIA* (March 5, 1932), in which mercuriochrome had been given to a patient with subacute bacterial endocarditis with a positive blood culture; after the third injection the treatment was stopped; each day the temperature became lower, which was a fortuitous circumstance; there was clinical evidence of infarction of the kidney, liver and lung, and of mesenteric embolism. Immuno-transfusion was discussed, but Dr. Penington persuaded the people not to have it done. From that time the patient gradually improved, and after an illness which lasted nine months longer the temperature became normal. Eleven years later the patient was carrying on her job with very little wrong with her health. If that transfusion had been given it might have been claimed that the result of such treatment was brilliant. Heroin helped to keep the patient quiet, and Nature did the rest.

With reference to iron in treatment, Dr. Penington expressed the opinion that sugar-coated pills or tablets that were hard must not be used. He had listened with interest to what had been said about the treatment of pyelitis, and would go further and say that the important thing was to get in an enormous quantity of fluid; even alkali was unnecessary then, except when the urine was concentrated in the early stages and strangury was present. He was not exaggerating when he stated that fluids to the extent of between eight and twelve pints a day could be forced into patients with beneficial results. He remembered a child of eight who regularly managed to take from twelve to fourteen pints a day; cystopurin, three tablets a day, was given for one day, and next day the urine was clear and remained clear.

Dr. ALAN PENINGTON said that he had used "Solganal" for one hundred and ten patients in eighteen months. Few people had realized the stipulation Møllegaard had made when he introduced "Sanocrysin". "Sanocrysin" produced a typical tuberculin reaction in animals, and with large doses these reactions occurred in the human subject, and the gold salt was dismissed as objectionable. At first the terminal dose had been one gramme; but such a dose produced a terrific tuberculin reaction, leaving the patient definitely worse; better results were obtainable with smaller dosage. Whether the best gold effect was produced by the efflux of time or by the gold salt used was a question, but some of the patients had been definitely

improved in a shorter space of time than would have been anticipated without the gold. Dr. Penington, in conclusion, considered that the use of gold salts was a matter for those with specialized knowledge or for those under the control of such a specialist. With careful selection of patients and with careful staging of doses he was confident that the effects would be better than had been alleged.

Dr. S. V. SEWELL, after expressing his appreciation of Dr. Hurley's paper, recalled the occasion on which Dr. James Mackenzie had come up from Burnley to demonstrate the polygraph in London. People who had studied cardiology had concentrated their attention on valvular lesions of the heart, but Sir James Mackenzie had emphasized the all-importance of the myocardium. Later in his life he had overstressed it because of the opposition of Broadbent and others, who had comparatively little knowledge of the physiology of the cardiac mechanism. Gray, of Canterbury, New Zealand, had related how he had seen Sir James Mackenzie professionally at St. Andrews, and after examining his heart expressed the opinion that it was a very good heart; Sir James pointed out that he really had not examined it completely, because he (Sir James) could not walk one hundred yards without getting precordial pain. Gray stayed at St. Andrews for eighteen months and came back a first-class cardiologist.

Dr. Sewell stated that it was difficult to teach students more than how to make a diagnosis and how to use drugs; the treatment of the individual who had the disease was a more difficult thing. With reference to gold treatment in tuberculosis and in chronic joint diseases, Dr. Sewell confirmed the view that had been expressed, that this treatment was of distinct value in carefully selected cases. He used it in what he termed "trench warfare" cases, but not in acute cases. The gold salts, given very carefully in small and gradually increasing dosage, had been quite the turning factor in such cases, with very great improvement within six months, and when there had not been any other factor except the introduction of hope and of some confidence in the future, a very important factor in a chronic disease like tuberculosis.

Dr. W. W. OSTERMEYER referred to swings to the right and to the left which had occurred with the passage of the years, indicating that by swings to the right he meant stressing the value of the laboratory and the test tube rather than bedside acumen. Dr. Ostermeyer pointed out that whereas a few years ago the swings had all been to the right, latterly the position had been somewhat reversed. Dr. Hurley had swung both ways. Dr. Ostermeyer had noted with interest how Dr. Hurley had stressed the psychological effect of alkalis and acids in the treatment of what might be termed psychological ulcer. When one read the life of Sir James Paget, written by his son, one realized that Sir James Paget a generation earlier had given much of what Sir James Mackenzie had given later, though of course Mackenzie had been more thorough and convincing. Dr. Ostermeyer preferred to refer to a case "with nephritis" or "with gastric ulcer" instead of using the term a case "of nephritis" or "of gastric ulcer", and in this matter he was in entire agreement with Dr. Sewell. He reminded those present of the motto of the great Virchow Hospital in Berlin, which might be translated to read: "Don't treat the disease, treat the man with the disease."

Dr. ARTHUR R. HEYWOOD said that at one stage in his life he had been employed in the laboratory of a manufacturing chemist and that he would like to refer to the difficulties in the manufacture of Bland pills. If one of these pills was not sufficiently dry, it was liable to burst when coated; if, on the other hand, it was too dry, it would be insoluble. At times one hundredweight or more of material might have to be sent back to be remixed. In these circumstances, though the factory standard was satisfactory, these pills would need to be used fresh; it had often struck him that they were not used fresh, but were kept in stock by the retail chemists for an indefinite period. He would suggest that the containers should bear the date of manufacture, as was the custom with sera and other articles which deteriorated, and, if they were

becoming stale, should be replaced by the wholesale houses. Dr. Heywood asked Dr. Hurley to indicate why the scale preparations were not used in place of the Bland pill.

Dr. WALTER SUMMONS expressed his appreciation of the quality of the paper and of the discussion, and called upon Dr. Hurley to reply.

Dr. Hurley, in reply, thanked the speakers, especially the opening speakers, for the way in which they had received his paper; he felt that it was disjointed and that he had not offered anything original. Dr. Heywood had asked the only question, and in reply he stated that he frequently used the scale preparations himself, but if he ordered a Bland pill he specified the soft Bland pill. Dr. Hurley would like to make it clear that he had not expressed an opinion about the use of gold salts, because he did not consider that he had given them a convincing clinical trial; he had merely made an observation that he thought that they were used locally to a greater extent than in other parts of the world. He was alive to the difficulty of assessing the value of any form of treatment in intermittent diseases and to the psychological aspect of the subject. He related Fishberg's account of the announcement of a new cure at an institution for the treatment of pulmonary tuberculosis. It was announced that there was only sufficient of the new remedy for the treatment of half the patients and that the other half would form a control group; in nine months the group treated gained approximately one stone in weight per person, and yet the material injected was merely distilled water. Dr. Hurley also referred to Trousseau's aphorism about taking a remedy quickly while it still had the power to cure. Dr. Hurley remembered a patient with extensive bilateral pulmonary tuberculosis whom he had seen in consultation, and for whom he had advised rest and a course of injections or gold salts; six months later he had seen the same patient again in consultation, and with the aid of another skiagram and a clinical examination of the patient it was established that the patient had made extraordinary improvement; he had been ready to ascribe it to the gold therapy, but as a matter of fact the patient had not had any gold. Dr. Hurley mentioned that he had known of three patients who had died from the toxic effects of gold salts; one of them with exfoliative dermatitis and two with acute purpuric manifestations. It had been claimed by some that histidine in the form of "Larostidine" could replace the usual dietary and antacid treatment of peptic ulcer; but Dr. Hurley considered that patients so treated were not so well symptomatically after one month of treatment. He wondered what effect this treatment would have on the ulcer, and considered that some idea might be gained by a careful investigation with serial skiagrams. He was interested to hear from Dr. Geoffrey Penington about the hydatid cyst in the muscles in the case to which he had referred; he had not known about the presence of the hydatid cyst before. Dr. Hurley said that though at one time he used digitalis in the treatment of pneumonia, he had discontinued its use latterly, as it was at least of doubtful benefit, and that the rapid dose method of digitalization was now available if this effect was required. He would like to make it clear to Dr. Lawton that his reference to the weighing of patients with oedema was intended to apply to those patients who were not exactly cot cases.

A MEETING of the Tasmanian Branch of the British Medical Association was held at the Tasmanian Museum on October 13, 1936. Dr. E. BETTINGHAM MOORE, the President, in the chair.

The Modern Treatment of Squint.

Dr. J. BRUCE HAMILTON read a paper entitled "The Modern Treatment of Squint and Prevention of Blindness" (see page 815).

Dr. J. R. R. CARTER congratulated Dr. Hamilton on his paper and said he wished that it had not been so brief. He agreed very strongly that treatment had to begin at the earliest possible time. Great tact and patience were

required with very young children. Glasses could be used at the age of two years. It was the duty of any medical man who saw a case of squint to see that the child was sent to an ophthalmologist forthwith. At the age of five or six years children would cooperate, but under the age of five years they would not do so. Amblyopia, so frequently seen, was a blot on the profession. Dr. Carter asked Dr. Hamilton if he had ever seen an instance of improvement of vision in a patient with amblyopia following an injury to the sound eye.

Dr. F. SHORT asked for information as to the causation of congenital strabismus. He also wished to know if the services of trained kindergarten teachers could be enlisted to supplement instruction given by the ophthalmologist. He felt that the work of such teachers was so outstanding that it might be utilized in this way.

Dr. W. COUNSEL stressed the need for better knowledge to prevent those cases of amblyopia, so common in this community, which were preventable. In such a condition the child might not know that he had no vision in one eye. The condition, when recognized, could be overcome only by the use of such instruments as those shown in the room that night. The lack of stereoscopic vision was of the greatest importance to the subject.

Dr. Hamilton, in reply, quoted a recent editorial in THE MEDICAL JOURNAL OF AUSTRALIA, on orthoptic training, and stated that he had written a letter in which he differed from the views expressed in it. In Dr. Hamilton's opinion it would be hard to overstress the need for an orthoptic council for Australia, so that both in the training for this work and in doing the work orthopticians might be regulated and controlled.

Dr. E. BRETTINGHAM MOORE thanked Dr. Hamilton for his address, and Dr. Hamilton then demonstrated a wide range of instruments as used in a modern clinic for the treatment of squint.

A MEETING of the Victorian Branch of the British Medical Association was held at the Queen Victoria Hospital, Melbourne, on September 16, 1936. The meeting took the form of a series of clinical demonstrations by members of the honorary medical staff of the Queen Victoria Hospital. Parts of this report appeared in the issues of November 28 and December 5, 1936.

Congenital Syphilis.

Dr. EDNA BAYLIS demonstrated a series of charts to illustrate the ante-natal and post-natal treatment of congenital syphilis at the Queen Victoria Hospital. She commented on the excellent opportunity offering at the hospital for this work to be carried through without interruption and therefore with satisfactory results. It was a routine procedure at the hospital to obtain specimens of the blood of prospective mothers and also of the blood from the umbilical cord at the time of birth. The blood was examined at the university by the Wassermann and other tests. Dr. Baylis stated that for the ten years from 1926 to 1936 there had been 12,812 births. It had been estimated that 8% of the mothers suffered from syphilis. When the cord blood was found to react to the Wassermann test, treatment by injections of an arsenical preparation was given to the babies within two or three weeks of birth and continued until there was no reaction. Dr. Baylis said that the advantages of efficient ante-natal treatment were amply evident in the work of the clinic.

Anæmia.

Dr. KATE MACKAY and Dr. PHILLIS TEWSLEY showed a number of patients suffering from a variety of types of anæmia.

Acute Hemolytic Anæmia.

The first patient was a woman, aged forty-nine years, who had been admitted to the Queen Victoria Hospital on June 17, 1935. Two months previously, after sitting in wet clothes, she had had a shivering attack and had

not felt well for some weeks afterwards, being easily nauseated and having occasional vomiting attacks. Five weeks after the wetting the patient again got wet and cold and noticed from the following day that her eyes and face were yellow. When admitted to hospital, though she was well nourished, she had an extraordinary greenish discoloration of the skin and conjunctive, and on the following day she had melena. The red blood cells numbered 1,500,000 and the white cells 9,000 per cubic millimetre; the hæmoglobin content was estimated at 33%; there was definite macrocytosis. The reticulocytes were estimated at 6%; but within seventy-two hours after injection of twenty cubic centimetres of "Campolon" rose to 48%. At that time the red cells numbered 1,200,000 and the hæmoglobin had fallen to 28%. By the quantitative Van den Bergh method the amount of bilirubin in the blood was estimated at 14.5 units. The result of the corpuscular fragility test was normal. A test meal showed the presence of free hydrochloric acid in the gastric contents. On three occasions within the following four weeks transfusion of 300 cubic centimetres (ten ounces) of blood was made and the patient appeared to have recovered completely; but during the few months prior to the meeting she had developed symptoms suggestive of biliary colic, and impairment of function had been demonstrated by cholecystography.

Hypochromic Anæmia.

The second patient was a woman, aged forty-two years, who had been admitted to hospital on May 25, 1936, for hysterectomy. For two years she had had slight but continuous intermenstrual bleeding. The menses lasted for three or four days and were not unduly profuse. She had been subject to attacks of diarrhoea for several months. She was very pale and the spleen could easily be felt; the uterus was enlarged and reached half way to the umbilicus; there was a systolic murmur audible at all cardiac areas. The red blood cells numbered 2,850,000 and the white cells 6,200 per cubic millimetre, and the hæmoglobin value was estimated at 23%. No free hydrochloric acid was present in the stomach contents after a test meal. After the administration of iron, the red blood cell count rose to 4,400,000 and the hæmoglobin value to 72%. It was proposed later to perform hysterectomy, as she had begun to have profuse bleeding.

Anæmia Associated with Pregnancy.

Dr. Mackay and Dr. Tewsley also showed three patients with anæmia associated with pregnancy. In two cases the anæmia was of the hyperchromic macrocytic type; in the other it was hypochromic.

Polyglandular Dyscrasia with Epilepsy.

Dr. Mackay and Dr. Tewsley also showed a female patient, aged twenty-seven years, who had reported first at the hospital ten years earlier with a history of four months' amenorrhoea associated with increase in weight and falling of hair. She had had nocturnal epileptic fits of a major character from the age of thirteen years. It was considered that her condition was subpituitary rather than subthyroid, although the *sella turcica* was of normal appearance radiographically. She was treated with thyroid extract and "Luminal". She attended intermittently for eight years and had reappeared three months before the meeting, looking grossly myxœdematous, and stated that she had not had any fits for two years. The basal metabolic rate was calculated to be -28%. The patient was given thyroid extract in a dose of 0.3 gramme (five grains) a day. She improved subjectively and objectively; but the major fits reappeared. With the addition of "Luminal" to the therapy reasonable control was regained.

Atypical Osteochondritis of the Hip.

Dr. BRUCE SCOTT showed a female patient, aged sixteen years, who had been treated at the Children's Hospital eight years earlier on account of pains in the leg and limp. She had scarlet fever at the age of eleven years. At intervals, for years, she complained of aching pains in

the thighs and fatigue; but, although she walked with a limp, there was no restriction of activity. When she stood, the right gluteal fold was lower than the left, and when she lay down, the right leg was slightly adducted and rotated medially; the right leg was 1.25 centimetres (half an inch) shorter than the left, and there was limitation of abduction and slight limitation of adduction, flexion and lateral rotation. Skiagrams of the hips revealed bilateral *coxa vara*, more pronounced on the left side, and flattening of the upper portion of the right femoral head with fragmentation, but no osteoporosis. The epiphyses of the upper ends of both femora had united unusually early. There was some sclerosis, limiting the affected area of the femur; there was no loss of cartilage space. It was considered that the condition was non-tuberculous and probably non-infective, but due to mechanical factors. The changes did not seem to be recent. The blood serum did not react to the Wassermann test. The red cell sedimentation rate was within normal limits. Dr. Scott thought that if the right shoe were raised 1.25 centimetres (half an inch) no other treatment was indicated.

Ophthalmological Cases.

DR. ADELAIDE GAULT showed a number of patients with conditions of ophthalmological interest. The first patient had toxic retinitis of pregnancy, with oedema of both maculae at the outset. Both retinæ were detached as a result of subretinal effusion.

Dr. Gault's second patient was a middle-aged woman with hyperplasia.

Dr. Gault also showed a patient with syphilitic juxta-papillary chorioiditis, and two patients with diabetic retinitis and subhyaloid hæmorrhages.

Dr. Gault's last patient was a baby, aged five days, suffering from a birth injury of the cornea. Delivery had been instrumental. The right eyelids were oedematous at birth, and, though subconjunctival hæmorrhage was apparent from birth and spread until only white rims showed at the limbus, the corneal opacity was not noticed until the baby was five days old. Dr. Gault described the condition as a rather rare birth injury, due to pressure on the eye, which had caused a split in Descemet's membrane at the back of the cornea; this had allowed aqueous humour to enter between the corneal lamellæ and accounted for the primary oedema. She considered that if the opacity did not clear away within a few days a permanent scar was likely to be left from the formation of fibrous tissue. She mentioned that fine linear streaks were also commonly found later.

Cretinism.

DR. KATE CAMPBELL showed a female baby who had been under treatment for cretinism from the age of ten weeks. The baby had advanced in weight from 3.15 kilograms (seven and a half pounds) at birth to 4.06 kilograms (nine pounds) on May 26, 1933, when treatment was started by the administration of 0.005 gramme (one-twelfth of a grain) of fresh thyroid extract in tablet form three times a day. At the age of six months the baby weighed 6.6 kilograms (14 pounds 10 ounces) and measured 57.5 centimetres (23 inches) in length. She was then getting 0.06 gramme (one grain) of thyroid extract daily. She sat up at eight months, crawled at eleven months, and walked with support at seventeen months, and was able to take a few steps alone at twenty months, when the daily amount of thyroid extract had reached 0.15 gramme (two and a half grains). Dentition was delayed; the first teeth were erupted at seventeen months, and only eleven were through at two years. Steady increase in weight was maintained. At the age of three years the length was 85.7 centimetres (35 inches) and the weight was 14.0 kilograms (31½ pounds); she had eighteen teeth and had gained control of the sphincters, but was still saying single words only. At the age of three and a half years the child was plump and cheerful, could speak in phrases, and was taking 0.48 gramme (eight grains) of fresh thyroid extract daily.

Celiac Disease.

Dr. Campbell also showed two children with celiac disease. The first child had been an inmate of a children's home for seven months before her appearance in the out-patient department of the Queen Victoria Hospital. During all that time she had suffered from diarrhoea, passing about six unformed brown and offensive stools each day. She was irritable. Her appetite was capricious and she had lost 1.1 kilograms (two and a half pounds) in weight in the previous month. Though she had a round, full face, her body was wasted, the buttocks were small and ill-developed, and the abdomen was large and distended. Her height was 85.0 centimetres (34 inches), but her weight was only 10.5 kilograms (23½ pounds). On analysis the fat in a dried sample of feces was estimated at 55%, and the total fat in a twenty-four hour specimen amounted to 2.3 grammes. Dr. Campbell said that the child had at first been treated without success by means of a fat-free diet, but was making satisfactory progress on Howland's three-phase diet, with the additional administration of "Radiostoleum" and iron.

The other child, aged four and a half years, had shown symptoms from the age of two years and nine months, at which time diarrhoea with stools typical of celiac disease had first been noted, associated with knock-knee and flat-feet. Radiographic investigation of the epiphyses eliminated rickets from the differential diagnosis. She was treated by means of a fat-free diet, and gained weight satisfactorily. On July 27, 1936, permission was given for the addition of a little butter to her bread; but after one week the stools became unformed and offensive and more frequent, and her diet was again restricted.

Obstruction of the Bile Duct in an Infant.

Dr. Campbell's next patient was an infant who had been well until the age of four weeks, when the stools became white and the urine deeply bile-stained. At the time of admission the infant was jaundiced and in a poor state of nutrition. The liver was slightly enlarged downwards. After one week in hospital the patient passed a plug of inspissated bile in a greenish stool. Succeeding motions were first green and then yellow. At the same time the jaundice cleared. Dr. Campbell considered that the plug of inspissated bile had obstructed the bile duct.

Pyelitis in the New-Born.

Dr. Campbell also showed a baby, a few weeks old, who had been well until the eighth day, when the temperature rose to 38.9° C. (102° F.) and the baby refused feeding and vomited; on the next day red blood cells were found in the urine, together with a few epithelial cells and sparse motile organisms, but no pus cells; in a further few days numerous pus cells and motile organisms were seen in the urine. Treatment by means of citration was carried out. The infant appeared to be well again; but the pyo-bacilluria had not cleared up.

Nephritis in the New-Born.

Dr. Campbell next showed a baby who had collapsed suddenly at the age of nine days and was still pale and grey on the following day, when he vomited twice and passed frequent green curdy stools; the urine contained a large quantity of albumin and a few red blood cells and leucocytes as well as granular and epithelial casts. For several days the baby was very ill and feverish; but at the age of seventeen days his condition improved considerably. At the time of the meeting there were a few red blood cells in the urine, but no casts.

A Sequel to Prematurity.

Dr. Campbell's last patient was a female child, aged two years. The baby was born prematurely owing to maternal albuminuria, and weighed 1.3 kilograms (three pounds fourteen ounces) at birth. She was fed on lactone-syrup milk for six months (three parts of milk and one part of water). The child, at the age of one year and eleven months, showed slowness in walking. On examination this

was seen to be due to spasticity of the left leg, also a little spasticity of the left arm; strabismus and hypermetropia were present. Dr. Campbell said that these symptoms, strabismus and spasticity, were rather frequently encountered in premature children.

COUNCIL MEETING.

A MEETING of the Council of the Victorian Branch of the British Medical Association was held in the Council Chamber, Medical Society Hall, East Melbourne, on October 28, 1936, Dr. J. NEWMAN MORRIS, the Chairman, in the chair.

SIR JAMES BARRETT, Immediate Past President of the British Medical Association, was welcomed by Dr. Walter Summons, the President, and congratulated on the exemplary and excellent manner in which he had held the distinguished position of President of the Association.

Impressions and Experiences Gathered Abroad.

Sir James Barrett said he keenly appreciated the invitation so kindly extended by the Council. There was an immense amount of information in *The British Medical Journal* concerning the Oxford meeting. Everything connected with the meeting had been very well done. But what was appreciated more than anything else was the fact that, to indicate the gratitude of the profession in Melbourne, New Zealand and Australia to the Parent Body for its immense service in visiting Australia, one of the Australian members had travelled 13,000 miles to say "thank you". The meeting had asked Sir James Barrett to convey the kindest messages to Dr. Major and others; and for the first time, he fancied, it was realized by the general body of members that the British Medical Association was an Empire organization, since one in five of its members lived overseas, and one in seven in Australasia. The Council, of course, was fully informed and its significance was now generally realized. The Canadian Medical Association was not incorporated with the British Medical Association, but affiliated with it. The overseas membership of the British Medical Association was likely to increase, and it must be regarded as a world-wide organization. Two of the many men who seemed very alive to the position and to the responsibilities of the British Medical Association were Dr. Le Fleming and Dr. Anderson, who had a splendid grasp of the whole position. Sir James Barrett had had long conversations with both these men and also with the President, Sir Farquhar Buzzard, about the future of medicine in England. They expressed themselves as being very concerned and realized that serious changes were coming and that the profession must be prepared to meet them. Municipalities, counties, had established hospitals for their own sick, with beds at least equal in number to those provided by the voluntary hospitals, and the medical staffs in the county hospitals were paid either on a part-time or full-time basis. The work, too, in these hospitals was being increasingly well done, although not much teaching was undertaken. Sir James Barrett had tried to get an understanding of the London County Council hospital system, but the figures in the financial statement were presented in such a way as to make it difficult. An accurate dissection of the figures was a task—roads, lunatic asylums and education being grouped together. He had put a simple and plain question to Sir Frederick Menzies, but because the figures were not easily available, the information was not supplied, in spite of courteous efforts. However, from an analysis which he had had made since his return, and which could be taken as reasonably accurate, the position showed that the London County Council hospitals were costing £4,000,000 a year to maintain and that the bed cost to the patient was up to £3 18s. 6d. a week—if he paid. Patients' contributions were, however, negligible, amounting to £180,000; the balance was provided by the rates. To maintain the great voluntary hospitals in the same area, providing not quite

so many beds, also cost £4,000,000. The annual cost of providing hospitals for 8,000,000 people was therefore £8,000,000, or £1 per head *per annum*, and similar arrangements were being made in the other counties. Sir James Barrett had discussed the matter with Sir Farquhar Buzzard, who was of the opinion that the two systems (the voluntary hospital and county council hospital) could not run side by side without modification. The hospital system which provided for a paid staff would attract the best brains and the result would be that the voluntary hospitals would either have to pay their staffs or be left behind. The change which was coming slowly seemed inevitable. This was an important matter, as it involved consideration of the steps that could be taken to preserve the general practitioner from extermination and to preserve his efficiency. Many members had come to the conclusion that there must be some provision for making the general hospitals available to the general practitioner for the care and treatment of his patients, so that when the general practitioner put his patient into hospital interest in that patient was not lost. The great contributory system was assisting the voluntary hospitals in their maintenance costs, but the benefits included nothing for medical services. It was also being recognized that the larger the hospital, the greater the cost per occupied bed. That did not necessarily mean that people should not build large hospitals; but it was known that if such hospitals were built they were going to be expensive. Maintenance costs in teaching hospitals were as a rule greater than in non-teaching hospitals. The average income in England was rather lower than in Australia. Here 82% of the population received £300 a year or less, and 95% £500 a year or less. The profession had to evolve a medical system for people earning moderate incomes. The man on such a salary could not pay fees for treatment in a private hospital. The Americans in their logical way had tried to solve the problem, and their solution was a system almost identical with that in force at Korrumburra, where the people paid ninepence per week and were entitled to sixteen guineas' worth of hospital treatment. There was just this difference between the systems in America and Korrumburra: in Korrumburra the whole of the administrative work was honorary, but in America, with huge numbers of patients, that was impossible. Under both systems, if a contributor got ill he was entitled to about two to four weeks in hospital free of charge. But the contributor could go into hospital only on the certificate of his medical practitioner, with whom he had to make his own business arrangement for his treatment. Over 300,000 people in America availed themselves of this provision. In March, 1936, in America there were over 1,000,000 beds in the government and non-government hospitals. Hospital beds for some years had been increasing at a far greater rate than the population, with the result that there were now 200,000 unoccupied beds. Approximately 30% of the hospital beds in the United States of America were controlled by the State or Federal authorities. The balance was owned and controlled by various organizations, religious and otherwise. The latter hospitals, as already indicated, derived an enormous amount of revenue from the group system—a system under which the hospital entered into a contract with groups whose members contributed so much to the group and for their subscriptions were entitled to so much hospital treatment. Dr. Larsen, whom Sir James Barrett had met again at Honolulu, was enthusiastic about the system and thought it a solution to the hospital problem. In New South Wales a voluntary scheme for hospital treatment was successfully working, and Mr. Stevens, the Premier, seemed satisfied with the arrangement. With regard to clinical work, that being done in Chicago was really of the first order. It was not team work in the Mayo sense, but it was wonderfully efficient.

Sir James Barrett said that in the United States of America one could not become a medical student only because one wished to. There were seventy-seven registered medical schools, and unless one graduated in one of those schools there was very little chance of doing well. The schools restricted their numbers last year to 6,000, chosen out of 13,000 applicants; and if a man was not included

in that number, the idea of taking up medicine as a profession had to be abandoned. America seemed quite satisfied with the arrangement. The reasons given for the restriction were: first, only the best men were wanted; secondly, there was room for no more; and, thirdly, there were quite enough already in the profession. Such a restriction in Australia might lead to some political discussion. At the McGill University only about 10% of the applicants were admitted as students, but some of the other schools took more. Sir James Barrett said that he did not sympathize with the system. Many other mixed population difficulties arose, and he was informed that in Columbia University Jewish students admitted were restricted to a number equal to the ratio the Jewish population bore to the total population of New York.

The American College of Surgeons was a very active body, and Sir James Barrett was very appreciative of the facilities and courtesies they had extended to him. He had also had the pleasure of meeting that remarkable man, Dr. Fishbein, of the American Medical Association. In Saskatchewan he saw a first-class cancer clinic containing about 300 beds and supported by the government. The work at the clinic was done very thoroughly. A permanent salaried officer was in charge and very careful records were kept. At British Columbia he had been asked to address a congress of medical men. There he learned that a health insurance bill had been passed through the legislature, but the regulations had not been drafted. The profession, however, had succeeded in getting a very common-sense general practitioner on the commission, and the interests of the profession seemed reasonably secure of consideration. Sir James Barrett took the opportunity of advising them to avoid the pitfalls experienced elsewhere and to see that fees for loss of work were separated from hospital or medical treatment, and that there were no cash payments to patients. He pointed out, too, that there should be provisions for necessary time off, that unemployment relief should be separated from sickness relief, and that certification should be made by government officers, on whom pressure could not be applied. Sickness and unemployment were two issues, and a separation of the one from the other was desirable.

Sir James Barrett had been grieved on his return to Australia to find that a hospital tax was in various ways slipping in. The Victorian Branch of the British Medical Association would have to see that the innovation did not go too far. Trouble was sure to follow. In the aggregate, Victoria was very well supplied with hospitals. Although the hospitals in Melbourne appeared to be crowded, country hospital beds were not fully occupied. If hospital committees could get money from the government they would go on spending and enlarging; this was a danger to be avoided. New Zealand furnished an example. Hospitals there cost something like two and a half times as much as in Victoria. The London County Council hospital system, too, taught a lesson. There, although it was costing the people £1 per head *per annum* for their hospitals, it was not easy to obtain a complete statement of the cost.

Turning back to the British Medical Association, Sir James Barrett said that it had become a very powerful and growing body in England, and as long as it retained its dignity and restraint, as at present, it would go on growing. The Association was doing its best to look after the interests of the general practitioner—the keystone to work in medicine. The general practitioner acted as a guide to the people, and he was the only man who could do it. His disappearance would be a disaster of the first order.

The President-Elect for 1937 was a very fine man. Every consideration had been extended to Sir James Barrett by officers of the Association. The editor and assistant editor of the journal both took a very keen interest in what was being done in the Dominions. He had also seen the Secretary of State for the Colonies (The Right Honourable Ormsby Gore) and discussed with him the splendid work being done in Fiji by the National Medical School.

Before leaving Australia, Sir James Barrett had been furnished with a letter to the Prime Minister (Mr. Baldwin). He went to Downing Street, wrote his name in the book, and left the letter. Within forty-eight hours he

received a message in, roughly, the following terms: "The Prime Minister would be glad to see you at some time that meets your convenience. I happen to know he will be free at 10 o'clock on Wednesday. Perhaps that time would suit you. If not, will you please name a time convenient to yourself." That was the sort of official courtesy Australia had to learn when making appointments or dealing with visitors. Obviously the load he had been carrying during the last two years had left the Prime Minister bodily tired. Some alteration in the present cabinet system would have to be made. A system would have to be devised under which ministers would be concerned only with the formulation of broad policy. Carrying out of details would have to be the responsibility of departmental heads. Dr. Anderson was going to India to organize the profession there. Letters of introduction were necessary. Sir James Barrett mentioned the matter to Mr. Baldwin, who said he would refer the matter to the Secretary of State for India. As soon as he got back to his hotel he received a telephone call making an appointment with the Secretary for India, who had been asked to find out what it was Dr. Anderson required. These matters indicated the courteous attention given to the British Medical Association.

In conclusion, Sir James Barrett said that he hoped the hospital question would be taken up by the Association. His way would be to make a clear statement of the case at issue, giving comparative costs in countries like New Zealand, the United States of America, England and Australia, to have it printed and to place a copy in the hands of Members of Parliament before they committed themselves to the slippery path. The argument would be used that the same people would pay whether the hospitals were financed by tax or otherwise, and that a tax would easily solve the whole difficulty. He hoped the profession would not be a party to any such policy. If a policy of financing hospitals by tax were instituted, anyone who wished it would be given hospital treatment. Action should be taken now to prevent an expedient from developing into an established practice.

Sir James Barrett thanked members of Council very much indeed for so patiently listening to all he had had to say.

DR. J. NEWMAN MORRIS, in moving a vote of thanks to Sir James Barrett for his extremely interesting address, referred to the ready manner in which he had accepted the invitation and come to the rescue of the Association on the death of Sir Richard Stawell. Sir James Barrett had carried the banner of leadership ably, reflecting the greatest credit on himself and on the members of the profession in Australasia. Particularly were members grateful to him for having taken the trip overseas to represent the Branches as only he could represent them. He had given evidence of the splendid use he had made of his time abroad, and the information he had gathered would be of tremendous value to members in Australia. Dr. Morris had the greatest pleasure in asking Sir James to accept a hearty vote of thanks from members of the Council of the Victorian Branch and all Branches in Australia for what he had done for medicine and the Association in Australia during the past year.

Sir James Barrett, in reply, said that he very much appreciated the opportunity given him to meet members of the Council. He urged that the Council should not fail to send every year, as it did this year, a cable or letter to the annual meeting expressing the good will of the Branch. At Oxford the action was very much appreciated.

NOMINATIONS AND ELECTIONS.

THE undermentioned has been elected a member of the Victorian Branch of the British Medical Association:

Smith, Sir Harold Gengoult, L.R.C.P. et S., 1917 (Edinburgh), L.R.F.P.S., 1917 (Glasgow), Melbourne.

Correspondence.

PULMONARY TUBERCULOSIS.

SIR: Dr. Eugene L. Ople has by cable given me permission to publish the enclosed correspondence. Would you be kind enough to publish in the journal these letters?

Yours, etc.,

J. COLVIN STOREY.

Craignish,
185, Macquarie Street,
Sydney,
November 30, 1936.

Craignish,
185 Macquarie Street,
Sydney,
Australia,
22nd August, 1936.

Eugene L. Ople, Esq., M.D.,
Cornell University Medical College,
New York.

Dear Sir,

Being on a committee of the staff of Royal Prince Alfred Hospital to report on the admission of tuberculous patients to the General Hospital, and also being ignorant of the subject, I am appealing to one who knows.

Professor H. K. Ward suggested that I should write.

Would you be kind enough to answer the following questions.

1. What is the practice in general hospitals in America about segregating cases with open tuberculosis or are they put in general wards with patients with other diseases?

2. If you segregate, how would you choose your nurses, (a) as to age, (b) as to tuberculin reaction?

3. Is there a higher incidence of adult tuberculosis among nurses looking after cases of open tuberculosis than among nurses looking after patients suffering from other diseases?

4. What precautions can be taken by nurses looking after patients with open tuberculosis?

5. Do you think there is any danger to other patients if cases of open tuberculosis are admitted to a general ward of the hospital—the bed spacing varies from four feet eight inches to five feet eleven inches?

6. In nurses looking after cases of open tuberculosis, would you advise routine periodical radiograms of lungs?

7. Would you recommend B.C.G. vaccination as prophylactic among nurses with a negative tuberculin reaction who are going to nurse cases of open tuberculosis?

Yours faithfully,

J. COLVIN STOREY, F.R.C.S.

Department of Pathology,
Cornell University Medical College,
1300 York Avenue,
New York, N.Y.

October 8th, 1936.

Dr. J. Colvin Storey,

Craignish,
185 Macquarie Street,
Sydney.

Dear Dr. Storey:

On my return from abroad I find your letter. I shall answer in order as far as I can the questions you ask.

1. An increasing number of general hospitals in this country are admitting patients with tuberculosis. The practice of pneumothorax has increased the number of cases with "open disease" admitted. I think it is the almost universal practice to segregate

these cases in separate wards or rooms. It would seem to me that this is essential.

2. Among those who are informed concerning the danger involved there is a disinclination to assign young women, and especially those with negative tuberculin reaction, to the nursing care of patients with tuberculosis, but there is no accepted procedure in regard to the matter.

3. I know of no satisfactory statistics answering this question. In a well-conducted ward I would expect that the incidence of adult tuberculosis was very little higher than that of the general population for the corresponding age. The danger of infection is however evident.

4. In the New York Hospital tuberculosis wards, patients with open tuberculosis wear masks over mouth and nose at times when there is danger of transferring of tubercle bacilli to those about them. Nurses attending such patients use masks and gowns when their duties bring them in close proximity to these patients. Gowns are discarded and sterilized when contaminated. Cleansing of hands, utensils, etc., is important.

5. I think there is a definite danger to other patients from open tuberculosis in the same room. I do not think that cases with open tuberculosis should be admitted to a general ward.

6. I think that periodic radiograms are desirable in such cases. In the New York Hospital all pupil nurses receive radiographic examination yearly; tuberculin tests also.

7. I have not felt justified in recommending B.C.G. vaccination for nurses in the New York Hospital.

Sincerely yours,

EUGENE L. OPLE.

AN APPEAL.

SIR: The Council of the Medical Benevolent Association of New South Wales is appealing to all members of the medical profession in this State for contributions to a fund for providing Christmas comforts and cheer to the unfortunate members of the profession and their dependants.

All contributions should be sent to The Secretary, Medical Benevolent Association of New South Wales, 135, Macquarie Street, Sydney.

Any surplus remaining after the allocation of an adequate sum to each beneficiary will be placed to the credit of the general fund of the Association.

Yours, etc.,

J. M. GILL,

Secretary.

135, Macquarie Street,
Sydney,
December 2, 1936.

Obituary.

JAMES LINKLATER THOMSON ISBISTER.

WE regret to announce the death of Dr. James Linklater Thomson Isbister, which occurred on December 1, 1936, at Wollstonecraft, New South Wales.

KENNETH DAVID McDONALD.

WE regret to announce the death of Dr. Kenneth David McDonald, which occurred on December 2, 1936, at Lane Cove, New South Wales.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

THE undermentioned have been registered, pursuant to the provisions of *The Medical Acts, 1925 to 1935*, of Queensland, as duly qualified medical practitioners:

Green, Ronald Aylmer, M.B., 1933 (Univ. Sydney), Boonah.

Murphy, Eileen Mary, M.B., B.S., 1929 (Univ. Melbourne), Westwood.

Corrigendum.

WE regret that an error has occurred in an article by Dr. H. T. Illingworth published at page 712 in the issue of November 21, 1936. The statement is made on page 713 that the patient received 0.065 gramme (one grain) of strychnine. The dose was 0.0022 gramme (one-thirtieth of a grain).

Books Received.

THE THYROID: SURGERY, SYNDROMES, TREATMENT, by E. P. Sloan, M.D., with a foreword by W. S. Bainbridge, M.D.; 1936. London: Baillière, Tindall and Cox. Double crown 9mo, pp. 483, with illustrations. Price: 45s. net.

A TEXTBOOK OF OBSTETRICS, by E. A. Schumann, A.B., M.D., F.A.C.S.; 1936. Philadelphia and London: W. B. Saunders Company; Melbourne: W. Ramsay. Medium 8vo, pp. 780, with 581 illustrations. Price: 40s. net.

A TEXT-BOOK OF PATHOLOGY, by W. G. MacCallum; Sixth Edition; 1936. Philadelphia and London: W. B. Saunders Company; Melbourne: W. Ramsay. Medium 8vo, pp. 1293, with illustrations. Price: 52s. 6d. net.

DISEASES OF THE AIR AND FOOD PASSAGES OF FOREIGN-BODY ORIGIN, by C. Jackson, M.D., Sc.D., F.A.C.S., LL.D., and C. L. Jackson, A.B., M.D., M.Sc. (Med.), F.A.C.S.; 1936. Philadelphia and London: W. B. Saunders Company; Melbourne: W. Ramsay. Crown 4to, pp. 983, with 2,000 illustrations, including 3 plates in colours. Price: 72s. 6d. net.

Diary for the Month.

Dec. 15.—New South Wales Branch, B.M.A.: Medical Politics Committee.

Dec. 15.—Tasmanian Branch, B.M.A.: Council.

Dec. 18.—Queensland Branch, B.M.A.: Council.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser", pages xviii-xxi.

AUSTIN HOSPITAL FOR CANCER AND CHRONIC DISEASES, HEIDELBERG, VICTORIA: Resident Medical Officer.

COMMONWEALTH OF AUSTRALIA, DEPARTMENT OF HEALTH: Medical Officer.

FREMANTLE HOSPITAL, FREMANTLE, WESTERN AUSTRALIA: Resident Junior Medical Officer.

LAUNCESTON PUBLIC HOSPITAL, LAUNCESTON, TASMANIA: Resident Medical Officer.

LORD HOWE ISLAND BOARD OF CONTROL: Medical Officers.

NEW PLYMOUTH HOSPITAL, NEW PLYMOUTH, NEW ZEALAND: Resident Medical Officers.

SYDNEY HOSPITAL, SYDNEY, NEW SOUTH WALES: Senior Resident Medical Officer.

TARA DISTRICT HOSPITAL, QUEENSLAND: Medical Officer.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY Hospital are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

Editorial Notices.

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